The Institute for Advanced Study

Annual Report 1980/81

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The Institute for Advanced Study

Annual Report for the Fiscal Year
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It is fundamental to our purpose, and our express desire, that in the appointments to the staff and faculty, as well as in the admission of workers and students, no account shall be taken, directly or indirectly, of race, religion or sex. We feel strongly that the spirit characteristic of America at its noblest, above all, the pursuit of higher learning, cannot admit of any conditions as to personnel other than those designed to promote the objects for which this institution is established, and particularly with no regard whatever to accidents of race, creed or sex.

Extract from the letter addressed by the Founders to the Institute's Trustees, dated June 6, 1930, Newark, New Jersey.

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The Institute for Advanced Study: Background and Purpose

The Institute takes the following premises on the nature of learning as fundamental: most important work is the product of the disciplined and creative individual mind; accordingly, the individual scholar must be responsible for how he uses the precious resources of his own time and energy; the community of peers in his area of intellectual work is the ultimate judge of the results. (From PROCEDURES FOR ACADEMIC GOVERNANCE OF THE INSTITUTE.)

The Institute for Advanced Study, an independent, private institution devoted to the encouragement, support and patronage of learning, was founded in 1930 as a community of scholars where intellectual inquiry could be carried out in the most favorable circumstances. Focused on mathematics and classical studies at the outset, the Institute today consists of the School of Historical Studies, the School of Mathematics, the School of Natural Sciences and the School of Social Science. Each School has a small permanent Faculty, and some 160 fellowships are awarded annually to visiting members from other research institutions and universities throughout the world.

The objectives of the Institute were described as follows in the Founders' original letter to the first Trustees: "The primary purpose is the pursuit of advanced learning and exploration in the fields of pure science and high scholarship to the utmost degree that the facilities of the institution and the ability of the faculty and students will permit." During the past half-century, these goals have been implemented by a Faculty of exceptional merit; by an annually renewed group of carefully selected visiting members; and by the development of facilities and a mode of operation designed specifically to support and assist the Institute's intellectual purposes in every way possible.

Although the Institute is small when measured in terms of the size of its immediate academic community or of its operating budget, its intellectual weight is great and its influence on science and scholarship extraordinary. From its earliest years, it has been internationally recognized as one of the world's leading centers of research. Indeed, its successful example has created numerous imitators both in the United States and abroad.

From the beginning the Institute has been an international organization, although American in location and organizational form. It has operated throughout its existence on the premise that science and learning transcend national boundaries and that scholars and scientists are members of one commonwealth of the mind. Of the present Faculty, many have begun their scientific and scholarly careers outside the United States. One-third of the visiting members come from abroad, mostly from the great centers of learning of western Europe and, to a lesser extent, from other regions of the world.

With its devotion to the continuing examination of new and centrally important questions as they arise at the frontiers of knowledge, the Institute partakes of the character of both a university and a research institute, while differing in significant ways from both. It is unlike a university, for instance, in its small size—its academic membership annually numbers somewhat under 200—and in the fact that it has no formal curriculum, no scheduled courses of instruction, no commitment that all branches of learning be represented in its Faculty and members. It is unlike the usual research institute in that it supports many separate fields of study, maintains no laboratories and determines its programs in terms of individual intellectual imperatives rather than the collective aims of research teams or the particular interests of potential donors.

For close to five decades the Institute for Advanced Study has made a substantial contribution to the world of higher learning by providing support—intellectual and material—to visiting members whose development and growth constitute one of its principal purposes. More than half of these visiting members are young men and women 35 years of age or less whose work at the Institute involves the Faculty in a substantial amount of postdoctoral training. Though none of the visiting members is a student in the narrow sense of being a degree candidate, educational growth lies ahead.

The Institute devotes special attention to young people of accomplishment and promise, and offers them membership at a stage in their careers when independent work is of the highest importance to their intellectual development. These younger members then return to or join the faculties of universities all over the world and share what they have learned as a result of their stay at the Institute. This might be termed the invisible work of the Institute; its visible work is contained in the publications of the Faculty and visiting members. Both serve to reinforce in highly significant ways the quality of scholarship and research throughout the world.

The varied work of the Institute is, of course, specialized; no advanced study or deep scholarship can be otherwise. Formal attempts to organize scholarly work at the Institute are minimized, although lectures and seminars are a regular feature of its internal life. The choice and conduct of research and study are matters which are decided entirely by each individual member of the Institute.

The Institute is nonetheless an intellectual community and not a mere collection of scholars. Community is possible because Faculty and members have some substantial knowledge outside their own fields of specialization. The fact that the visiting members live together in Institute housing, eat in the same dining hall, share the same common room and libraries, and carry out their work in an institutional setting where human scale has been carefully maintained is conducive to common interest, mutual understanding and friendship.

The Faculty and members of the Institute are also a part of the larger community of Princeton, with its University and its many institutions of research and learning. Many Institute seminars are open to interested members of the University's faculty and graduate school, and University seminars and conferences are frequently attended by Institute Faculty and members. Without the University, Princeton itself would be both physically and intellectually inadequate as the site of the Institute; and the Institute has brought a degree of international excellence to the general academic community of Princeton, contributing to the development of what has become one of the world's great educational centers.

The Institute today occupies a square mile of land in Princeton, New Jersey. Most of this is farm and woodland. Its buildings house libraries, offices for Faculty and members, seminar and lecture rooms, and common rooms. Although the Institute has no administrative or organic connection with Princeton University, there has always been close collaboration between the two institutions on matters of common interest.

Report of the Chairman

During the year under review, the Institute lost three of its Trustees Emeriti, each of whom in different ways made major contributions to the building of the institution to which all were devoted.

Amory Houghton, Sr., chairman emeritus of the Corning Glass Works, former United States ambassador to France, and Institute Trustee and Trustee Emeritus since 1967, died at the Medical University Hospital in Charleston, South Carolina, on February 21, 1981. He was preceded on the Institute Board by his father, Alanson B. Houghton, who served as the first Chairman of the Institute and as its President. Amory Houghton was succeeded on the Board by his son James R. Houghton, who has been an Institute Trustee since 1971. The service of this illustrious family to the Institute over the five decades of its existence has been exemplary in every way.

Harold K. Hochschild, the former head of a large metals company and an active Adirondacks historian and conservationist, died at Columbia Presbyterian Medical Center on January 23, 1981. A Trustee and Trustee Emeritus of the Institute since 1953, Mr. Hochschild made numerous contributions to the Institute, the best known of which is Mary Marquand House, Mr. Hochschild's home in Princeton, which he gave to the Institute in 1978. Mary Marquand House was named for Mr. Hochschild's wife, the former Mary Marquand, daughter of Eleanor Marquand and Professor Allan Marquand, founder of the art department at Princeton University.

Harold F. Linder, a former president and chairman of the United States Export-Import Bank and former ambassador to Canada, died at Lenox Hill Hospital in Manhattan on June 22, 1981. Until his death Mr. Linder served the Institute from 1949, first as Treasurer and then as Chairman of the Board of Trustees. In the months before his death, the Harold F. Linder Professorship was established by his family and friends in the Institute's School of Social Science. At the meeting of the Institute's Board on October 23, 1981, the Trustees passed the following resolution:

On the occasion of the formal establishment of the Harold F. Linder Professorship in the School of Social Science, the Trustees of the Institute for Advanced Study recall with affection their esteemed fellow Trustee Harold F. Linder and express their profound appreciation to those who have made possible the creation of this endowed chair in his honor.

Harold Linder's service to the Institute spanned three decades, as Treasurer of the Corporation, Chairman of the Finance Committee, and Chairman of the Board. During those years, his foresight and skill in financial matters made a vital contribution to the growth of the Institute's resources. We who were privileged to know and work with him shall never forget his warmth, his calm good humor, and his courtly urbanity. Nor shall we forget the quality of his leadership, which was most in evidence when the need was greatest.

Those who follow us here cannot share this privilege with us, but the memory of Harold will remain forever alive at the Institute for Advanced Study, thanks to his own generosity as well as to the generosity of his immediate family and friends who cherished him for his character and his accomplishments and who knew of his attachment to the Institute which he served so well. For them—family, friends, benefactors of the Institute—we here record our enduring gratitude for this most appropriate and most welcome memorial.

At the April 1981 meeting of the Corporation, all corporate officers except the Chairman were reelected for an additional term. Reelected to the Board for terms expiring in

April 1985 were Fletcher L. Byrom, James R. Houghton, Martin E. Segal, and Frank E. Taplin.

Having reached the statutory age for retirement as Chairman, and having announced my retirement at the previous meeting of the Board, I was particularly gratified that my fellow Trustees chose J. Richardson Dilworth as my successor. Mr. Dilworth, since 1976 President and Vice Chairman of the Board, was elected to the Board of Trustees of the Institute in 1964 and has served on all of the major committees of the Board.

A native of Hewlett, New York, Mr. Dilworth attended Saint Mark's School and Yale University, where he was elected to Phi Beta Kappa and from which he graduated with a B.A. degree in 1938. He then went to the Yale Law School and received his law degree in 1942. He has been the senior financial adviser to the Rockefeller family since 1958, retiring from the position only recently. Previously he was a partner in the investment banking firm of Kuhn, Loeb & Co.

Mr. Dilworth is married to the former Elizabeth Cushing, and they have two sons and two daughters. They live in Princeton, New Jersey.

As part of the current fiftieth year anniversary commemoration of its founding years, the Institute is now seeking contributions to a Fiftieth Anniversary Fund, the income from which will be used to provide permanent annual stipend support for 50 visiting members from each year's total group of some 160. The Director's Report which follows presents detailed information about the fellowship program of the visiting members, whose intellectual development—particularly that of the younger postdoctoral members—was a central purpose of the Founders in establishing the Institute for Advanced Study.

The investments of the Institute have from the start been managed with great skill. Investment performance has been better over a long period than any comparable fund. To assure the high quality of the Institute it is most desirable to augment its funds. We have an eminent Faculty and attract top quality members. All in all we are fulfilling our function well and deserve support.

In closing, I should like to add a personal note. It has been my pleasure and privilege to serve as Chairman of the Institute's Board since 1974. I here record my gratitude to my fellow Trustees for their support in moments of difficulty and their companionship in good times and bad. I take satisfaction in noting that the Institute is in many ways both internally stronger and contributing more to the international network of higher education than at any time in its history. Whatever my contribution has been to that process, the result is gratifying indeed.

Howard C. Petersen
Chairman

Report of the Director

Before turning to other events in the life of the Institute in the years 1930 to 1980, I should like to add my own expression of appreciation to the presentation by his fellow Trustees to Howard C. Petersen on the occasion of his retirement as Chairman of the Board. It has been my privilege to work with Howard Petersen for the first five years of my directorship. I have counted on him for his support in more ways than I can enumerate here. Our feelings for him are perhaps best expressed by the following Trustee resolution of April 25, 1981:

To our colleague Howard C. Petersen, our affectionate and deep appreciation for his numerous contributions as Trustee, beginning in 1969, and continuing as Chairman of the Finance and Nominations Committees (1972-73) and as Chairman of the Board (1974-81). His diplomatic skills, sound judgment and firmness of purpose in protecting the interests of the Institute as a whole were always in evidence and never more than during the difficult early years of his leadership of the Board. Frequently it was his good humor and good sense that kept us moving toward goals worthy of a great institution. His patience and his wisdom were crucial ingredients to the solutions to sometimes painful problems. He has our gratitude, our friendship and our admiration, and we look forward to his continued fellowship as Trustee.

In his report, Mr. Petersen referred to the Fiftieth Anniversary Fund and its uses for the visiting members fellowship program. Few private institutions in the world can equal the Institute's record of support for advanced individual research and scholarship or surpass it in the care exercised in the selection of those who comprise its community of scholars. In the pages which follow, I will describe various aspects of this program which, as Mr. Petersen has indicated, is a central purpose of the Institute for Advanced Study.

Selection

Selection of visiting members is made on the basis of applications sent to each School. Applications are normally submitted by October 15 of the preceding year. All visiting members are chosen on the basis of open competition.

The Faculty of each School constitutes a permanent search and selection committee. Through wide reading and personal contact, each of the Faculty identifies the more promising and distinguished scholars in his particular field and in the larger realm of his School's interests. Some of these scholars are encouraged to apply for membership.

This has traditionally been an important way of bringing members to the Institute, but it is relied on to a decreasing degree. Nor is it true that an invitation to submit an application is tantamount to appointment; solicited applications go through the same process of discussion and election by the entire Faculty of each School as do the unsolicited. Final selections for each School are made by each School's Faculty.

The largest number of applications arrive unsolicited. The most powerful force for bringing in such applications is word-of-mouth recommendations throughout the scholarly world by former members. The other forces that bring in applications are the Institute's well-established reputation and direct notification in several directories and scholarly journals.

The major consideration in choosing a visiting member is the expectation, based on past performance, that his or her term at the Institute will result in work of high quality and significance. The largest number of visiting members are selected because their proposed research projects fall within the special interests of one or more of the Faculty; a smaller number receive appointments because their work, even though outside Faculty interests, is outstanding. These appointments are made, however, when the Faculty is certain that the Institute and its environs contain the necessary research facilities to insure a productive stay.

In the selection of members great care is taken to find the best possible balance. Senior scholars of well-established reputation are weighed against younger applicants who have promise but fewer published works. The best of foreign scholars are sought to maintain the Institute's international character. Often advantage can be taken of special situations to bring together from distant areas scholars in the same field who can collaborate at the Institute. Emphasis is given to those whose interests cross the boundaries of traditional disciplines.

Support Services

The Institute provides secretarial, duplicating and interlibrary loan services to all members, and it operates its own computer facilities. It also maintains a dining hall and housing for all visiting members except the few in any particular year who may be selected to come from the Princeton area.

Each member has an office of his or her own of approximately 150 square feet. In addition, there are several seminar rooms, large and small lecture rooms, and common rooms, which the members share with each other and with the Faculty, as well as substantial working space in the Institute libraries.

Visiting members at the Institute rely on several libraries. One is the Institute's own Historical Studies library. This is a small, specialized library of about 75,000 volumes, including 1,100 periodical titles. It is intended to serve as a working reference collection of source material and authoritative works in the disciplines represented by the Faculty. The general emphasis is on western European culture to the twentieth century, particularly in the fields of archaeology and classical studies, history of science, philosophy and art, and medieval and Renaissance history. The collection in classical studies is particularly noteworthy. In addition, there is a small Social Science reading room with a collection of material on anthropology, sociology and economics, as well as a large selection of current periodicals.

There is also a collection of 3,200 rare books. Its nucleus is the Herbert M. Evans history of science library given to the Institute by one of its former Trustees, Lessing J. Rosenwald, himself a noted collector. Through gifts and additions from special funds, the collection now contains fine editions in other fields as well, ranging from incunabula such as Euclid's *Elementa* and the works of Plotinus to a definitive edition of Machiavelli.

Located in the Institute's Fuld Hall is the Mathematics-Natural Sciences library, which contains some 25,000 volumes, most of which are bound journals.

Another library facility for visiting members is the Firestone library of Princeton University, to which Institute members have access on the same terms as members of the Princeton faculty. Firestone library, which has some three million volumes, is among the twenty largest university libraries in the country. It is particularly strong in classics, economic history, the humanities, the Near East, and the social and behavioral sciences. The Institute maintains a large study in Firestone library for the use of those of its members who work in it regularly.

Yet another library used by visiting members is Marquand library, operated by the department of art and archaeology at Princeton University. It is a non-circulating library of 118,000 volumes which reflect the interests and needs of the department. Additionally, the department provides access to the Index of Christian Art, recognized as a unique source in that field. By agreement with the library, art historians and other scholars at the Institute make use of a study room at Marquand set aside for the exclusive use of its Faculty and members.

In addition, the Speer library of Princeton Theological Seminary is open to members of the Institute.

The interlibrary loan service of the Institute's own library can be used to find what is not available locally, and there is frequent shuttle service between the Institute and the libraries mentioned above.

Some Statistics

- The Institute for Advanced Study is first among all public and private fellowship programs in the United States in the awarding of residential fellowships.
- Some 3,100 visiting members have been in residence at the Institute during the period 1930-80.
- Work done by visiting members while in residence at the Institute has resulted in more than 5,600 publications to date.
- Of the 3,100 visiting members, 67 percent have been in mathematics and the natural sciences, and 33 percent have been in the humanities and social science.
- More than half of these men and women have been 35 years of age or younger at the time of their membership.
- Institute records show country of birth for 2,827 members; 1,241 of these have come from the United States and 1,586 from 61 other countries.
- 2,285 members whose institutions of affiliation at time of membership are known have come to the Institute from 506 institutions throughout the world.
- 2,275 members whose present locations are known currently hold active or emeritus faculty positions at 446 institutions of higher learning worldwide.
- Among former members, 14 have been awarded the Nobel Prize; 8 the National Medal of Science of the United States; 19 the Fields Medal of the International Mathematical Union, the major international prize in mathematics; 9 the Dannie Heineman Prize awarded jointly by the American Physical Society and the American Institute of Physics; 4 the Bancroft Prize in history; and 6 the Haskins Medal of the Mediaeval Academy of America.

Institutions of Current Affiliation

In the United States, former members hold positions in 186 universities, colleges or research centers; the largest concentrations are presently at these institutions:

University of California at Berkeley	67
Princeton University	50
Harvard University	48
Columbia University	47
University of Illinois	46
Rutgers University	40
University of Michigan	38
University of Pennsylvania	37
Massachusetts Institute of Technology	33
University of California at Los Angeles	33
Cornell University	32
University of Chicago	32
University of Washington	31
Yale University	29
University of Wisconsin	28
Johns Hopkins University	26
Stanford University	25
University of Maryland	25
Purdue University	24
New York University	23
State University of New York at Stony Brook	22
University of Texas	22
University of Minnesota	21
Indiana University	21
Brown University	19
Pennsylvania State University	18
University of Virginia	17
University of Massachusetts	16
University of North Carolina	15
University of California at San Diego	14
University of California at Santa Barbara	14
Rice University	13
Brandeis University	12
California Institute of Technology	12
University of Rochester	12
Ohio State University	11
University of Oregon	11
University of Utah	11

Washington University	11
Duke University	10

The largest concentrations of former members presently on the faculties of universities and research institutions abroad are in the following countries:

United Kingdom	181
Germany	105
France	95
Japan	86
Canada	51
Switzerland	49
Italy	39
Israel	32
India	23
Australia	20
The Netherlands	20
Poland	15
Denmark	13
Brazil	11
People's Republic of China	11
Sweden	10

In addition to the countries listed above, former members currently hold faculty positions at institutions in Argentina, Austria, Belgium, Botswana, Bulgaria, Chile, Colombia, Egypt, Finland, Greece, Hong Kong, Hungary, Ireland, Jamaica, Lebanon, Mexico, Nigeria, Norway, Puerto Rico, Rumania, Spain, Taiwan, Turkey, the USSR, Venezuela, Vietnam and Yugoslavia.

Financial Data

The visiting members program that brings scholars annually to the Institute from universities and research institutions both here and abroad represents one of the world's largest residential fellowship programs.

In fiscal 1979 the average cost per member was approximately $24,400.

Over the past ten years the Institute has disbursed some $35 million in direct and indirect support of its visiting members program. Institute expenditure for this program in fiscal 1979 represented 62.7 percent of annual operating expenditure for that year, a figure that has remained relatively constant during the past decade.

Year	*Number of members in residence*	*Stipends granted*	*Academic support services provided*
1970	131	$ 893,200	$1,444,500
1971	131	1,033,800	1,674,100
1972	126	1,124,900	2,046,200
1973	134	1,122,200	2,229,700
1974	144	1,262,500	2,528,400
1975	167	1,409,200	2,668,200
1976	144	1,357,000	2,418,100
1977	151	1,319,100	2,377,900
1978	165	1,432,100	2,366,100
1979	170	1,438,000	2,710,000

As part of its visiting members fellowship program, the Institute is currently participating in a Minority Postdoctoral Fellowship Program which is sponsored by the Ford Foundation with additional support from the National Endowment for the Humanities. Awardees in residence at the Institute during 1981 were Amassa Fauntleroy of the University of Illinois at Urbana-Champaign (mathematics—algebraic geometry), John G. Ratcliffe of the University of Wisconsin at Madison (mathematics—combinatorial group theory), and Vera M. Green of Rutgers University (anthropology—cultural, applied and developmental).

In Memoriam

The year under review was marked by the passing of two former members of the Institute Faculty.

Andrew Alföldi, professor emeritus and a distinguished scholar of ancient history, died on February 12, in the Princeton Medical Center at the age of 85. He was born in Hungary, where he was a professor at Debreczen and later Budapest from 1923 to 1947. After posts in the Berne and Basle universities in Switzerland, he joined the Institute in 1955.

Professor Alföldi devoted his long and productive life to studies of many aspects of Roman history, from the earliest periods to the late empire and the peoples beyond the frontiers. His fresh and original work quickly attracted the interest of scholars in his field, who acknowledged its importance. He became a member of many academies, including the Institut de France and the British, Royal Swedish, Lincei (Rome), Göttingen, Mainz, Bavarian, Danish, Hungarian, Austrian and Bulgarian academies among others. Among his honors were the German order "Pour le Mérite," Les Palmes Academiques (France) and the Gold Medal of the City of Rome. He received an honorary doctorate from the University of Paris and other universities.

Professor Carl Ludwig Siegel, one of this century's leading mathematicians, died April 5 in Göttingen, West Germany, at the age of 84. He made fundamental discoveries in the theory of numbers, the theory of analytic functions and celestial mechanics.

Professor Siegel was born in Berlin and at the age of 25 was appointed to a full professorship at the University of Frankfurt, where he was a member of the faculty from 1922 to 1937. He was then a professor at the University of Göttingen until he left Germany in 1940 to join the Institute for Advanced Study, where he remained as a member conducting his own research until 1945.

In 1945 he was appointed a faculty member of the Institute and took part in administrative and policy-making functions. While here he also served as an adjunct professor of mathematics at New York University.

Professor Siegel remained with the Institute until 1951, when the government of West Germany invited him to accept a chair at the University of Göttingen. He was professor emeritus of mathematics there at his death.

In 1978, Professor Siegel was one of nine leading scientists who shared the $500,000 Wolf Prize, established in 1976 by the Israeli parliament. Professor Siegel was cited for his work in the theory of numbers, complex variables and celestial mechanics.

Honors and Distinctions

The most meaningful measure of the contribution of the Institute to international research and scholarship is the work done by its Faculty, professors emeriti and members. Continuing recognition of the achievements of Institute Faculty and members with long-term appointments is demonstrated by the following list of this year's honors and distinctions.

ENRICO BOMBIERI, School of Mathematics, was awarded the 1980 Balzan Prize by the International Balzan Foundation "for his studies on number theory and minimal surfaces which have brought him general recognition as one of the leading mathematicians of our time."

ARMAND BOREL, School of Mathematics, was named a member of the Académie des Sciences de l'Institut de France.

GLEN W. BOWERSOCK, School of Historical Studies, delivered the Lily Ross Taylor Memorial Lecture at Bryn Mawr College. He was elected vice president of the Modern Greek Studies Association and a member of the editorial board of the *American Scholar*.

MARSHALL CLAGETT, School of Historical Studies, was awarded the George Sarton Medal of the History of Science Society and the John Frederick Lewis Prize of the American Philosophical Society.

ROGER DASHEN, School of Natural Sciences, delivered the Amos de Shalit Lecture at the Weizmann Institute.

CLIFFORD GEERTZ, School of Social Science, was chosen to present the bicentennial address to the American Academy of Arts and Sciences at its May 15, 1981, meeting.

FELIX GILBERT, professor emeritus in the School of Historical Studies, was awarded the Howard R. Marraro Prize of the American Catholic Historical Association. He was also awarded an honorary Doctor of Humane Letters by Middlebury College and was elected a member of the order "Pour le Mérite für Wissenschaften und Künste."

HARISH-CHANDRA, School of Mathematics, was awarded the honorary degree of Doctor of Science by Yale University. He was also elected a member of the National Academy of Sciences.

ALBERT O. HIRSCHMAN, School of Social Science, was the 1980 recipient of the Frank E. Seidman Distinguished Award in Political Economy, given annually by Southwestern at Memphis.

George F. Kennan, professor emeritus in the School of Historical Studies, was chosen by the Albert Einstein Peace Prize Foundation as recipient of its second annual peace prize for his continuing efforts to ease tension between the United States and the Soviet Union.

Robert P. Langlands, School of Mathematics, was elected a Fellow of the Royal Society, London.

Irving Lavin, School of Historical Studies, was awarded the Medal of Honor, City of Rome, commemorating the tercentenary of the death of Gianlorenzo Bernini. In a ceremony on the Capitoline Hill in Rome on January 16, 1981, the mayor of the city of Rome presented the medal to Professor Lavin to honor the publication of his recent study of the artist, *Bernini and the Unity of the Visual Arts*. Professor Lavin was also the recipient of Premio Daria Borghese (Rome, 1981) and of the Medal of Honor, City of Montevarchi (tercentenary of Francesco Mochi, 1981).

Kenneth M. Setton, School of Historical Studies, was the 1980 recipient of the Haskins Medal of the Mediaeval Academy of America.

Michael Walzer, School of Social Science, was awarded an honorary Doctor of Humane Letters by Brandeis University.

Hassler Whitney, professor emeritus in the School of Mathematics, was elected a foreign associate of the Académie des Sciences de l'Institut de France.

Harry Woolf was awarded an honorary Doctor of Science by Whitman College.

Shing-Tung Yau, School of Mathematics, was awarded an honorary Doctor of Science degree by the University of Hong Kong in December 1980. Professor Yau was also selected as the recipient of the John J. Carty Medal given by the National Academy of Sciences. He was awarded the Oswald Veblen Prize in Geometry by the American Mathematical Society, which cited the several branches of geometry in which Professor Yau has made important contributions: the theory of nonlinear elliptic partial differential equations, the topology of low-dimensional manifolds, and the analytic geometry of complex manifolds. The Society stated that "few mathematicians can match Yau's achievements in depth, in impact, and in the diversity of methods and applications."

Bernini Colloquium

In commemoration of the death of Gianlorenzo Bernini in 1680, Professor Irving Lavin organized a colloquium at the Institute on April 11-12, 1981. Accompanying the colloquium was a premier performance of Bernini's comedy *The Impressario* by the Theatre Intime at Princeton University. A dozen papers dealing with various aspects of Bernini's life and work were presented during the two-day meeting by art historians from Europe and America.

Members' Program

During 1980-81 there were 157 members and 20 visitors at the Institute. Forty-eight percent of the members were under the age of 35. Nine percent of them were women. Taken together, they came from 108 universities and research institutions in 26 countries. The names, academic backgrounds and fields of interest of this year's members and visitors are described in the pages which follow.

Among the many scholars of note who have been part of our community this year, special mention should be made of Professor Eytan Sheshinski, who was an Oskar Morgenstern Distinguished Fellow during 1980-81. The award, sponsored by Mathematica, Inc., commemorates the scientific contributions of Professor Oskar Morgenstern, co-founder of Mathematica and chairman of its board of directors from 1959 until his death in 1977.

The Director's Visitor this year was Richard Llewelyn-Davies, architect and city planner. Lord Llewelyn-Davies was former head of the Bartlett School of Architecture at the University of London and professor emeritus of town planning.

Reports of the Schools

The School of Historical Studies

Faculty

Glen W. Bowersock
Marshall Clagett
John H. Elliott
James F. Gilliam
Christian Habicht
Irving Lavin
Kenneth M. Setton
Morton White

Professors Emeriti

Andrew Alföldi
Harold F. Cherniss
Felix Gilbert
George F. Kennan
Benjamin D. Meritt
Homer A. Thompson

Members with Long-term Appointments

Herman H. Goldstine
Bernard Lewis
Otto E. Neugebauer

The School of Historical Studies

There is no work in the School of Historical Studies as extensive—and at the same time as concentrated and coherent—as that in pure mathematics or in theoretical physics, nor is any attempt made to cover all fields of historical scholarship. Rather, work has been encouraged in areas of research—political, intellectual and artistic, and largely focused on the Western world—which are manifestly fruitful and in which a very high level of scholarly excellence, intellectual interest and fundamental historical discovery is assured. The development of the School of Historical Studies has been defined by a measured movement into new fields which reveal such characteristics and by a continued exploration of those disciplines which by design and by tradition have been associated with historical research at the Institute from its beginnings.

Over the years the School of Historical Studies has mirrored the varied interests of its individual Faculty and visiting members, but certain developments have been more or less continuous for close to half a century. These have stressed Greek and Roman antiquity, medieval history and the history of art. In more recent times such main currents of inquiry have been augmented by interests in the history of mathematics and of the sciences, modern European and American history, the history of modern philosophy and the history of modern diplomacy.

The traditional aspects of the historian's craft are the work of narration and interpretation, of establishing legitimate connections among the varied experiences of human beings and their organizations, and of bringing the proven documents to bear on events to be described at least as asymptotically true. This continues to characterize the historian at work at the Institute as elsewhere. In doing so it stresses the role of the individual scholar as master of the entire endeavor, so that whether one is concerned with the transmission of Archimedes' thought in the Middle Ages, the complex relationship between the papacy and the Levant over several centuries, the philosophy of the American Revolution, or the relationship between Spain and its American empire, the historian at the Institute does not generally engage in group projects.

Cooperation does occur of course as well as occasional collaboration; master-disciple relationships, the peer level exchanges, the seminars and lectures common to academic interchange everywhere also characterize the life of historians at the Institute. Additionally, the Institute's considerable impact on the course of historical scholarship has been obtained and multiplied through the influence acquired and spread by visiting members who have come and gone over the years and who now number close to a thousand.

Academic Activities, 1980-81

The School was host to thirty-nine long-term, term and annual members in 1980-81. During the summer of 1980 it also provided research facilities for thirteen summer visitors. Twenty-one members came from foreign countries, including Canada, England, France, the Federal Republic of Germany, Israel, Italy, Japan, Rumania, Switzerland and Turkey.

As is customary, the members' fields of interest ranged over the entire spectrum of the School's areas of specialization, from ancient Greece and Rome to various aspects of modern European history, including the Middle Ages, the Renaissance and the Reformation.

All members and visitors at the Institute are independent scholars and concentrate on their own subjects. But the contacts and exchanges with one another are often fruitful and stimulating, whether in the same field or one at a distance. In addition to occasional collaborative projects, there are formal colloquia—lectures followed by discussions—in art history on a monthly basis in which Princeton University's department takes part, and in classical studies roughly eight to ten times each term which scholars from the area attend. Some of the members regularly give papers at the meetings of the Institute's School of Social Science; others occasionally attend. Virtually all visiting members keep in regular touch with at least one member of the Faculty.

The professor emeriti, all in residence except Professor Benjamin D. Meritt, continued their individual research. The School mourns the loss of Andrew Alföldi who, at the age of 85, died on February 12, 1981, only a few hours after he had left his desk for the night.

Professor Harold F. Cherniss continued his study of Aristotle's criticism of Plato and the Academy.

Professor Felix Gilbert's *The Pope, His Banker and Venice* was published by Harvard University Press, and Professor Gilbert continued to work on the larger project, of which the book is a part, dealing with Venetian politics at the time of the League of Cambrai in the early sixteenth century. He taught for one term as Bonsell Professor at Stanford University and published various papers on topics of historiography as well as "Einstein's Europe," in *Some Strangeness in the Proportion: A Centennial Symposium to Celebrate the Achievements of Albert Einstein*.

Professor George F. Kennan continued work on his multi-volume study of the Franco-Russian alliance of 1894. This involved both preparation of a German edition of the first volume, which has already appeared, and continued writing and research on the second volume.

Professor Homer A. Thompson published several articles on the history and the archaeology of ancient Athens and lectured in various places. He participated in the symposium that accompanied the exhibition "In Search of Alexander the Great" at the National Gallery of Art in Washington. He also continues to supervise the publication of the excavations in the Athenian Agora prior to 1968; volume 22 is now in page proof and volume 23 is in the hands of the editor. Professor Thompson has been named *Ehrenmitglied* by the German Archaeological Institute.

As for members with long-term appointments, Professor Herman H. Goldstine saw the publication of his book *A History of the Calculus of Variations from the 17th through the 19th Century*. He is currently engaged in work on a book on the nature of computer science.

Professor Otto E. Neugebauer published various articles and reviews, finished others that are now in press, and had several others accepted for publication. Work in progress now includes *The Mathematical Astronomy of Copernicus* (with N. Swerdlow).

Professor Bernard Lewis completed his book *The Muslim Discovery of Europe* on which he has been working for a number of years. It is scheduled for publication in the spring of 1982. On March 15, 1981, Professor Lewis delivered the special plenary lecture at the annual meeting of the American Oriental Society in Boston. The subject was "The Attack on the Orientalists." During the year he also took part in the preparation of a television series on the history of the Middle East for the Ontario Educational Communication Authority.

Among the present Faculty, Professor Glen W. Bowersock, during his first year at the Institute, lectured at four American universities as well as at University College, London, and the University of Rome. He published various articles and reviews and served as vice president, chairman or North American representative on various national and international committees and boards.

Professor Marshall Clagett worked on volume 5 of his *Archimedes in the Middle Ages*. In press is his paper "Conic Sections in the Fourteenth Century," in *Filosofia e scienze nella tarda scolastica: Studi in memoria di Anneliese Maier*. He was awarded the George Sarton Medal of the History of Science Society in Toronto (1980) and the John Frederick Lewis Prize of the American Philosophical Society (1981) for volumes 2-4 of his *Archimedes in the Middle Ages*.

Professor John H. Elliott has published two books: *A Palace for a King: The Buen Retiro and the Court of Philip IV* (with J. Brown), Yale University Press, and *Memoriales y Cartas del Conde Duque de Olivares*, volume 2 (with J. de la Peña), Madrid.

Professor James F. Gilliam's research has been largely divided between Roman elements in Egypt during the first three centuries of the Empire and the Imperial Army, especially auxiliary units. His publications are "Notes on a New Latin Text: P. Vindob. L 135," *Zeitschrift für Papyrologie und Epigraphik* and "An Addition to the Archives of Soknobraisis," *Papyri Greek & Egyptian, in honour of Eric Gardner Turner*. In the XVI International Congress of Papyrology (New York, July 23-31, 1980), he took part as president of the organizing committee and chairman of the program and budget committee.

Professor Christian Habicht completed his book *Studien zur Geschichte Athens in hellenistischer Zeit* which will appear as a volume of *Hypomnemata*. He submitted various articles and reviews for publication and also worked on Pausanias the Periegete for the Sather Classical Lectures in 1982-83.

Professor Irving Lavin, with others, published *Drawings by Gianlorenzo Bernini from the Museum der bildenden Künste*, Leipzig, exhibition catalog, Princeton. He also organized "Gianlorenzo Bernini (1598-1680): A Commemorative Colloquium" held at the Institute in April 1981.

Professor Kenneth M. Setton continued work on the third volume of his *Papacy and the Levant, 1204-1571*, based largely on research in Italian archives. He expects to finish this volume before the end of 1982, during which year he hopes also to see through the press the fifth volume of the *History of the Crusades*, of which he has long been editor-in-chief.

Professor Morton White published a book in June 1981 with the Oxford University Press: *What Is and What Ought To Be Done: An Essay on Ethics and Epistemology*.

The School of Historical Studies

Members with Long-term Appointments, Members, Visitors and Assistants, 1980-81

In the section which follows, the information was obtained from material provided by the members, visitors and assistants.

Members with Long-term Appointments

Herman H. Goldstine. *History of computers and computation; theory of computing machines.*

Born 1913, Chicago, Illinois. University of Chicago, BS 1933, MS 1934, PhD 1936; honorary doctorate University of Lund 1974, Amherst College 1978, Adelphi University 1978.

University of Chicago, research associate and instructor 1936-39; University of Michigan, instructor and associate professor 1939-42; US Army, in charge of development of ENIAC and of EDVAC 1942-46; IBM Corporation, research planning staff 1958, director of mathematical sciences 1958-65, consultant to director of research 1967-69, IBM Fellow 1969- ; Institute for Advanced Study, Electronic Computer Project, associate director 1946-57, School of Mathematics, permanent member 1951-58, School of Natural Sciences, member with long-term appointment 1972- , School of Historical Studies, member with long-term appointment 1977- .

Bernard Lewis. *Islamic history.*

Born 1916, London, England. University of London, BA 1936; University of Paris, Diplôme des Etudes Semitiques 1937; University of London, PhD 1939; honorary doctorate Hebrew University 1974, Tel Aviv University 1979.

University of London, School of Oriental and African Studies, assistant lecturer in Islamic history 1938, lecturer 1940, senior lecturer 1946, reader 1947, professor of the history of the Near and Middle East 1949-74; University of California at Los Angeles, visiting professor 1955-56; Columbia University, visiting professor 1960; Indiana University, visiting professor 1963; Princeton University, visiting professor 1964, Cleveland E. Dodge Professor of Near Eastern Studies 1974- ; Institute for Advanced Study, member 1969, member with long-term appointment 1974- .

Otto E. Neugebauer. *History of exact sciences in antiquity.*

Born 1899, Innsbruck, Austria. University of Göttingen, PhD 1926; University of St. Andrews, LLD 1938; honorary doctorate Brown University, Princeton University.

University of Göttingen, assistant professor 1927-33; founder and joint editor of *Quellen und Studien zur Geschichte der Mathematik, Astronomie, und Physik* 1930-38; University of Copenhagen, research professor 1933-39; University of Cambridge, W. Rouse Ball Lecturer 1939; Cornell University, Messenger Lecturer 1949; Brown University, professor of the history of mathematics and professor emeritus 1939-69; Institute for Advanced Study, School of Historical Studies, member 1950-55, 1959-60, member with long-term appointment 1960- , School of Natural Sciences, member 1950, 1952, 1954, 1956, 1958, member with long-term appointment 1960- .

Members

Petre Alexandrescu. *Greek archaeology.*

Born 1930, Paris, France.

L'Institut d'Archéologie, Bucharest, chef de la Section d'Archéologie gréco-romaine.

Ernst Badian. *Greek history.*

Born 1925, Vienna, Austria. New Zealand, BA, MA; University of Oxford, BA, MA, DPhil; Victoria University, New Zealand, LittD.

University of Sheffield, lecturer in classics; University of Durham, lecturer in classics; University of Leeds, professor of ancient history; State University of New York at Buffalo, professor of classics and history; Harvard University, professor of history 1971- .

Bernard Bailyn. *Anglo-American history.*

Born 1922, Hartford, Connecticut. Williams

College, AB 1945; Harvard University, AM 1947, PhD 1953; LHD Lawrence University, Bard College, Clark University, Yale University, Grinnell College; LittD Williams College, Rutgers University, Fordham University.

Harvard University, assistant professor 1954-57, associate professor 1958-60, professor 1961- , Winthrop Professor of History 1966- ; John Harvard Library, editor in chief 1962-70; *Perspectives in American History*, co-editor 1966-67; University of Cambridge, Trevelyan Lecturer 1971.

David Nicholas Cannadine. *Ritual and politics in nineteenth- and twentieth-century Britain and the empire.*

Born 1950, Sandwell, UK. University of Cambridge, BA 1972, MA 1975; University of Oxford, DPhil 1975.

University of Cambridge, research fellow, St. John's College 1975-77, assistant lecturer in history 1976- , fellow, college lecturer and director of studies in history, Christ's College 1977- ; *Urban History Yearbook*, editorial committee 1978- .

C.M.D. Crowder. *Council of Constance, 1414-1418.*

Born 1922, Weybridge, Surrey, England. University of Oxford, MA 1948, DPhil 1953.

University of Aberdeen, assistant to the professor of history 1950-53; The Queen's University, Belfast, lecturer in paleography and diplomatic in modern history; Queen's University, Kingston (Ontario, Canada), associate professor of history 1966-69, professor and associate dean of graduate studies 1969- .

Peter S. Derow. *Rome and the East.*

Born 1944, Newport, Rhode Island. Amherst College, BA 1965; University of Oxford, BA 1967; Princeton University, PhD 1970.

University College, Toronto, assistant professor of classics 1969-73, associate professor 1974-77; Institute for Advanced Study, member first term 1976; Wadham College, University of Oxford, fellow 1977- .

James S. Donnelly, Jr. *Agrarian violence and secret societies in Ireland, 1760-1845.*

Born 1943, New York, New York. Fordham College, AB 1964; Harvard University, MA 1965, PhD 1971.

University of Tennessee at Chattanooga, assistant professor 1969-72; University of Wisconsin-Madison, assistant professor 1972-75, associate professor 1975- .

Paul Corby Finney. *Archaeology and history of the early church.*

Born 1939, Springfield, Massachusetts. Yale University, BA 1962; Harvard University, MA 1973, PhD 1973.

Dumbarton Oaks, 1969-71; ACLS, Jerusalem, 1977; Hebrew University, 1979; American Philosophical Society, Rome, visiting senior lecturer 1979; University of Missouri at Saint Louis, associate professor.

David A. Freedberg. *The status of images in the sixteenth and seventeenth centuries.*

Born 1948, Cape Town, South Africa. Yale University, BA 1969; University of Oxford, DPhil 1973.

University of London, Westfield College, lecturer 1973-76, Courtauld Institute of Art, lecturer 1976- .

Doris S. Goldstein. *The development of the British historical profession, 1850-1922.*

Born 1927, New York, New York. Queens College, City University of New York, BA 1948; Smith College, MA 1949; Bryn Mawr College, PhD 1955.

Yeshiva University, instructor, assistant professor, associate professor, professor, 1958- .

John C. Greene. *History of American science, 1780-1820.*

Born 1917, Indianapolis, Indiana. University of South Dakota, BA 1938; Harvard University, MA 1939, PhD 1952.

University of Chicago, instructor 1948-52; University of Wisconsin, assistant professor of history 1952-56; Iowa State University, associate professor, professor, 1956-62; University of California at Berkeley, visiting professor 1962-63; University of Kansas, professor 1963-67; University of Connecticut, professor 1967- .

Nikolaus Himmelmann. *History of Greek art (early votive offerings).*

Born 1929, Münster, Germany. University of Munich, Dr. Phil. 1955.

German Archaeological Institute, traveling fellowship 1956; University of Marburg, assistant and lecturer 1957-64; University of Saarbrücken, full professor 1964-68; University of Bonn, full professor 1968- .

R. Stephen Humphreys. *The cultural origins of Arabic historiography.*

Born 1942, USA. Amherst College, AB 1964; University of Michigan, MA 1966, PhD 1969.

State University of New York at Buffalo, assistant professor 1969-75; University of Chicago, visiting assistant professor 1975-77, visiting associate professor 1978- .

Paul R. Hyams. *Medieval history, law and society, 1000-1300.*

Born 1940, Leeds, England. University of Oxford, AB 1963, MA 1967, DPhil 1968.

University of Oxford, Jesus College, Scurry Jones J. Res. Fellow 1965-69, Pembroke College, Official Fellow 1969- , C.U.F. Lecturer 1970- ; Institute of Medieval Canon Law, Berkeley, Robbins Senior Fellow 1975.

Jale Inan. *Sculpture recovered at Perge.*

Born 1914, Istanbul, Turkey. University of Berlin, PhD 1943.

University of Istanbul, assistant 1943-53, lecturer 1953-63, professor 1963; excavations at Perge, director; Institute of Research, Antalya Region, director; Institute for Advanced Study, member 1967-68, 1973-74, 1980-81 second term.

Benjamin H. Isaac. *Greek and Latin epigraphy in Israel.*

Born 1945, Geneva, Switzerland. University of Amsterdam, AB 1968, MA 1972; Tel Aviv University, PhD 1980.

Archaeological Institute, Amsterdam, 1970-71; Tel Aviv University, department of classics, staff member 1973- .

Eva C. Keuls. *A study of the role of women in classical Athens.*

Born 1923, Amsterdam, Holland. Hunter College, BA 1961; Columbia University, MA 1962, PhD 1965.

Brooklyn College, instructor 1965-66; Emory University, assistant professor 1966-67; Howard University, associate professor 1967-73; University of Minnesota, professor 1973- ; Institute for Advanced Study, Netherlands, fellow 1976-77.

Ernst Kitzinger. *History of art.*

Born 1912, Munich, Germany. University of Munich, PhD 1934.

British Academy, London, 1935-40; Dumbarton Oaks Center for Byzantine Studies, 1941-67; Harvard University, 1967- , A. Kingsley Porter University Professor Emeritus 1979- ; Institute for Advanced Study, member 1966-67.

George Knox. *Piazzetta and Tiepolo studies.*

Born 1922, London, England. University of London, AB 1950, MA 1954, PhD 1968.

University College, London, Slade School of Fine Art, assistant lecturer 1950-52; University of Durham, King's College, Newcastle, lecturer 1952-58; College of Art, Portsmouth, senior lecturer 1963-69; Queen's University, Kingston (Ontario, Canada), associate professor 1969-70; University of British Columbia, professor and head, department of fine arts, 1970-79.

Jacques Lafaye. *The invention of Spain in Spanish historiography.*

Born 1930, Paris, France. Sorbonne, AB 1952, MA 1953, PhD 1971.

Institut des Hautes Etudes de L'Amérique latin, Paris, professor 1958-68; CNRS, research attaché 1962-64; School of Advanced Spanish Studies, Madrid, member 1968-71; Sorbonne, professor 1971- .

Lucjan R. Lewitter. *Russo-Polish relations in the reign of Peter the Great.*

Born 1922, Kraków, Poland. University of London, BA 1947; University of Cambridge, BA 1946, PhD 1951.

University of Cambridge, university assistant lecturer 1948-53, university lecturer in Slavonic studies 1953-68, professor of Slavonic studies 1968- , Christ's College, fellow 1948- , director of studies in modern languages 1951-64, tutor 1960-68.

Edward H. Madden. *History of American philosophy.*

Born 1925, Gary, Indiana. Oberlin College, AB 1946, MA 1947; University of Iowa, PhD 1950.

University of Connecticut 1950-59; Brown University 1954-55; California State University at San Jose 1959-64; Linacre College, University of Oxford, senior visiting research fellow 1978; State University of New York at Buffalo, professor of philosophy.

John Frederick Matthews. *Late Roman history, especially Boethius.*

Born 1940, Leicester, UK. PhD 1970.

University of Oxford, Balliol College, Dyson

Junior Research Fellow in Greek Culture 1965-69, Corpus Christi College, university lecturer in middle and late Roman history and fellow and tutor 1969-76, The Queen's College, lecturer in middle and late Roman history and fellow and tutor 1976- .

A. George Molland. *History of science.*

Born 1941, Lynton, Devon, England. University of Cambridge, AB 1962, MA 1966, PhD 1967.

University of Aberdeen, assistant lecturer 1965-67, lecturer 1967-79, senior lecturer 1979-

Jennifer I. R. Montagu. *Art history, Charles Le Brun and the theory of expression.*

Born 1931, London, England. University of Oxford, AB 1952; University of London, PhD 1960.

Arts Council of Great Britain, Manchester, assistant regional director 1953-54; Warburg Institute, University of London, junior fellow 1955-57; University of Reading, faculty of French, part-time lecturer in art history 1958-60, School of Art, lecturer in art history 1960-64; Warburg Institute, photograph collection, assistant curator 1964-70, curator 1970- .

Jeffrey M. Muller. *History of art.*

Born 1948, New York, New York. Queens College, City University of New York, AB 1969; Yale University, MA 1972, PhD 1977.

Yale University, instructor 1974-75; Paul Mellon Centre for Studies in British Art, London, 1976; American Academy in Rome 1978-79; Bowdoin College, assistant professor 1979-80; Brown University 1980- .

Benjamin I. Nadel. *Ancient history, especially the northern shore of the Black Sea (Ukraine, Crimea).*

Born 1918, Petrograd, Russia. Belorussian University, Dipl. 1941; USSR Acad., Leningrad, Dipl. 1947.

Université de Paris, Chargé de cours 1969; University of Chicago, visiting associate professor 1969-70; Northern Illinois University, visiting professor 1970-71; Franconia College, professor 1972-78; Bund Archives, New York, director.

Shoichi Oshimo. *American history in the Revolutionary War period.*

Born 1929, Kyoto, Japan. Doshisha University, AB 1954, MA 1956.

Yenching Institute, Harvard University, visiting scholars program 1958-59; Doshisha University, research assistant and instructor 1956-64, associate professor 1964-69, professor 1969- , Center for American Studies, director.

Rudolf Preimesberger. *Baroque sculpture.*

Born 1936, Ebensee, Austria. University of Vienna, Dr. Phil. 1962; University of Munich, Habil. 1977.

University of Vienna, assistant 1963-66; Austrian Institute, Rome, scholarship holder 1966-67, assistant 1967-68; Bibliotheca Hertziana, Rome, assistant 1968-72; Zentralinstitut für Kunstgeschichte Munich, vice director 1972-79; University of Regensburg, visiting professor 1974-75; University of Munich, visiting professor 1977-78; Free University of Berlin, visiting professor 1978-79, professor 1979- .

Amelie O. Rorty. *History of philosophy: Descartes to Rousseau.*

Born 1932, Antwerp, Belgium. University of Chicago, BA 1951; Yale University, MA 1954, PhD 1961.

Wheaton College, instructor, assistant professor, 1957-61; Rutgers University, assistant professor, associate professor, professor, 1961- Barnard College, visiting assistant professor 1962-63; Princeton University, visiting assistant professor 1962-63; Haverford College, visiting associate professor 1968-69; University of Cambridge, visiting lecturer 1971-73.

H. Diane Russell. *History of art.*

Born 1936, Missouri. Vassar College, AB 1958; Johns Hopkins University, PhD 1970.

Smithsonian Institution Traveling Exhibition Service, research assistant 1960-61; museum curator 1964-70; American University, professorial lecturer 1966-72, 1978; National Gallery of Art, assistant curator of graphic arts 1970-76, curator of French prints.

Claire Salomon-Bayet. *History of science.*

Born 1932, Caen, Calvados, France. Sorbonne, Licence ès Lettres 1951, DES de Philosophie 1953, Certificat d'Ethnologie-Sciences 1954, Agrégation de Philosophie 1957, Doctorat d'Etat 1976.

Lycée Pasteur, Besançon, professeur de première supérieure 1957-59; Université de Toulouse, assistante à la Faculté des Lettres, et secrétaire de rédaction des *Etudes Philosophiques* et de la *Revue l'Enseignement Supérieur* 1959-63; Sorbonne, maître-assistante 1963-68; CNRS, attachée de recherche 1969-76, chargée de recherche 1976- .

Jean-Claude Schmitt. *Medieval history.*
Born 1946, Colmar, Haut-Rhin, France. Ecole Nationale des Chartres, Paris, Archiviste Paléographe 1971, Agrégation d'Histoire 1971; Sorbonne, Doctorat de 3^e cycle 1973.
Zentrum für Interdiziplinäre Forschung, Bielefeld, 1976; Ecole des Hautes Etudes en Sciences Sociales, Paris, maître-assistant.

Peter A. Siewert. *Unpublished Greek documents on bronze tablets from Olympia.*
Born 1940, Friedrichshafen, Federal Republic of Germany. University of Munich, PhD 1970.
Kommission für Alte Geschichte, Munich, wissensch. Angestellter 1970-71; Universität Saarbrücken, wissensch. Angestellter 1971-73, Assistenzprofessor 1973-79; Fellowship Center for Hellenic Studies, Washington, DC, 1974-75.

Hans-Peter Stahl. *Awareness of self and situation in Euripidean characters.*
Born 1932, Lübeck, Federal Republic of Germany. University of Kiel, Dr. Phil. 1956.
Westfälische Wilhelms-Universität, Münster/Westfalen, wissenschaftlicher Assistant, Dozent, Privat-Dozent (venia legendi), Wiss. Rat und Professor; Harvard Center for Hellenic Studies, Washington, DC, junior fellow; Yale University, associate professor; University of Pittsburgh, Andrew W. Mellon Professor of Classics; Institute for Advanced Study, member 1974-75.

Teodora Tomasevic-Buck. *Legio I Martia at Castrum Rauracense.*
Born 1933, Belgrade, Yugoslavia. University of Belgrade, PhD 1958; University of Basel, PhD 1967.
Gesellschaft Pro Vindonissa, Brugg, in charge of excavations 1962-63; Arch. Zentralstelle für den Nationalstrassenbau, Basel (excavations at Vicus and theater of Lenzburg), 1964-65; Foundation Pro Augusta Raurica (excavations at Augst/K'Augst) 1967-69; Amt für Museen und Archäologie des Kantons Baselland (excavations at Augst/K'Augst) 1970- , director of excavations 1975- .

Imre Toth. *History of Greek mathematics.*
Born 1921, Satumare, Federal Republic of Germany. Bolyai University, Cluj, license 1948; University of Bucharest, PhD 1948.
University of Bucharest, associate professor 1951-68; University of Frankfurt/Main, visiting professor 1969-71; University of Bochum, professor 1971; University of Regensburg, professor 1972- ; Ecole Normale Supériore, Paris, 1975; Princeton University, visiting fellow 1975-76.

Roberto Vivarelli. *Italian history after World War I.*
Born 1929, Siena, Italy. University of Florence, Laurea 1954, Libera Docenza 1967.
Istituto Italiano per gli Studi Storici, Naples, fellow 1956-59; Rockefeller Foundation, fellow 1959-60; St. Antony's College, University of Oxford, research fellow 1961-62; University of Siena, assistente ordinario 1962-70; Institute for Advanced Study, member 1969-70; University of Florence, professore incaricato, 1970- .

Visitors

Robert Darnton. *Eighteenth-century history; the rise of the intelligentsia.*
Born 1939, New York, New York. Harvard College, AB 1960; University of Oxford, BPhil 1962, DPhil 1964.
Harvard University, junior fellow 1965-68; Princeton University, assistant professor, professor, 1968- ; Ecole Pratique des Hautes Etudes, VI Section, directeur d'études 1970-71; Center for Advanced Study in the Behavioral Sciences, fellow 1973-74; Center for Advanced Study, Netherlands, fellow 1976-77; Institute for Advanced Study, School of Historical Studies, visitor 1979-80, School of Social Science, member 1979-80 first term.

William W. Fortenbaugh. *Theophrastus: collection and edition of the Fragments.*
Born 1936, Philadelphia, Pennsylvania. Princeton University, BA 1958; University of Oxford, AB 1961; University of Pennsylvania, PhD 1964.
Rutgers University, instructor 1964-65, assistant professor 1965-68, associate professor 1968-79, professor 1979- .

S. D. Goitein. *Medieval Islamic and Jewish history.*
Born 1900, Burgkunstadt, Bavaria. University of Frankfurt, PhD 1923.

Hebrew University, lecturer, professor, 1928-57; University of Pennsylvania, professor 1957-70, affiliated professor 1970-71; Institute for Advanced Study, visitor 1971- .

A. Dudley Shapere. *Reason and scientific change.*
Born 1928, Harlingen, Texas. Harvard College, AB 1949; Harvard University, MA 1955, PhD 1957.

Ohio State University, instructor 1957-60; University of Chicago, assistant professor 1960-65, associate professor 1965-67, professor 1967-72; Rockefeller University, visiting associate professor 1965-66; University of Illinois at Urbana, professor 1972-75; University of Maryland at College Park, professor of philosophy 1975- ; Institute for Advanced Study, member 1978-79.

Assistants

James Amelang. *Early modern Spanish and Catalan history.*
Born 1952, USA. Princeton University, PhD 1981.

Institute for Advanced Study, assistant to Professor John H. Elliott, 1980- .

Susan M. Babbitt. *Medieval history.*
Born 1949, Dayton, Ohio. University of California at Berkeley, BA 1970; Cornell University, MA 1972, PhD 1977.

Institute for Advanced Study, assistant to Professor Kenneth M. Setton 1975- .

Alfred S. Bradford, Jr. *Ancient history.*
Born 1942, Appleton, Wisconsin. University of Wisconsin, BA 1964; University of Chicago, MA 1966, PhD 1973.

University of Wisconsin, lecturer 1973-74; University of Illinois at Chicago Circle, visiting assistant professor 1977; Institute for Advanced Study, assistant to Professor Christian Habicht 1977- .

Mark Darby. *Medieval political theory.*
Born 1954, Aberdeen, Maryland. Vassar College, AB 1976; Cornell University, MA 1978.

Institute for Advanced Study, assistant to Professor Marshall Clagett 1980- .

Edith W. Kirsch. *Medieval and Renaissance art.*
Born 1932, New York, New York. Cornell University, AB 1953; Princeton University, MFA 1971, PhD 1981.

Institute for Advanced Study, assistant to Professor Millard Meiss 1964-68, assistant to Professor Irving Lavin 1975- ; University of California Extension Program in Italy, guest lecturer July 1974; Princeton University, Index of Christian Art, research assistant 1974-75; Rutgers University, visiting lecturer 1976-77.

Gerd Stumpf. *Classical studies.*
Born 1943, Forbach, France.

University of Saarbrücken, assistant instructor in history; Institute for Advanced Study, assistant to Professor Emeritus Andrew Alföldi 1980- .

The School of Mathematics

Faculty

Enrico Bombieri
Armand Borel
Harish-Chandra
(IBM von Neumann Professor)
Robert P. Langlands
John W. Milnor
(Oswald Veblen Professor)
Atle Selberg
Shing-Tung Yau

Professors Emeriti

Arne Beurling
Deane Montgomery
André Weil
Hassler Whitney

The School of Mathematics

Perhaps more than any other subject, pure mathematics is a cumulative science, for theories once proven remain part of its living body. They may change in the light of new insights and give rise to unexpected patterns of reasoning, but they do not vanish. Obviously, the historical context of the mathematics tradition, reaching back into ancient epochs and multiple cultures as well as developing through time into an ever wider set of specialized forms and designs, has produced the same specializations and difficulties of communication common to the history of other great disciplines. However, from time to time, their fragmentation finds its counterforce in unifying theories that bring hitherto unrelated divisions together and, under such unexpected and usually parsimonious insights, renders accessible to a wider community enormous fields of knowledge with intellectual efficiency and aesthetic rewards.

For this rhythm of extension and accretion to succeed, communication and exchange that maximize matching, and resonance, and even confrontation are absolutely essential. Over time, various centers have created the locus for such possibilities. The international focus of mathematical discussion in the first part of this century took place at the University of Göttingen. When it was extinguished, the Institute for Advanced Study rekindled the flame, bringing within its fold Europeans such as Kurt Gödel, Carl Ludwig Siegel, John von Neumann and Hermann Weyl, and adding to their presence such American luminaries as James Alexander, Marston Morse and Oswald Veblen. The proximity of a strong mathematics group at Princeton University also played a part in relocating and centering the new School in a benign and sympathetic environment.

As in the other Schools, formal organization is minimal. Although problems are not selected for team research, seminars, discussion groups, formal lectures and informal gatherings abound in a mélange that reflects thematic concentration and individual predilections. In response to the interests of the Faculty over time, the School has been primarily concerned with five areas broadly understood: topology; analysis and global analysis; Lie groups, algebraic groups, automorphic functions and number theory; algebraic geometry; and logic.

One feature of the School of Mathematics which differentiates it from the other Schools within the Institute is its commitment to a publishing endeavor. The School participates formally in the editing of the *Annals of Mathematics*, the leading mathematical journal in the United States. Among other contributions, the aperiodic Hermann Weyl Lectures given at the Institute are published in the *Annals of Mathematics Studies*. Essentially educational and informative, the series consists of a broad survey of recent work by experts in a given area for the benefit of those in other fields or specialties. In fact, this serves as a device whereby the Faculty itself encourages communication among the various subdivisions of mathematics and, equally, seeks to stimulate research in areas beyond the Faculty's own range.

Academic Activities, 1980-81

The year under review was very active, involving many weekly seminars as well as special lectures by members and by distinguished invited speakers.

Lectures given by members of the Faculty, ranging through automorphic forms, number theory, differential geometry and history, were as follows: Enrico Bombieri on Diophantine Equations; Armand Borel on Cohomology of Arithmetic Groups and Automorphic Forms; Harish-Chandra on The Weak Inequality and Automorphic Forms; Atle Selberg on Sieve Methods; André Weil on Was Euler an Ancestor of Bourbaki?; and Shing-Tung Yau on Monge-Ampère Equations.

Regular lectures on Lie algebras and combinatorial identities were presented by James I. Lepowsky and Robert L. Wilson. There were seminars in complex geometry and algebraic geometry, and the regular weekly seminar organized by Professor Yau on differential geometry. The topology seminar took place each week throughout the year. It was followed by a seminar on several complex variables.

Several distinguished visitors contributed to the activities of the School. Eugenio Calabi gave the Marston Morse Memorial Lecture on A Survey of Affine Differential Geometry. Charles Fefferman was the Hermann Weyl Lecturer in the fall, speaking on Eigenvalues of Differential Operators. R. M. Karp spoke on The Structure of Complexity Classes in the spring term Hermann Weyl Lecture Series. L. K. Hua of Peking spoke on Some Geometric Aspects of Partial Differential Equations and on A Direct Approach to the Goldbach Problem.

There were special lectures by M. Gromov of the State University of New York at Stony Brook, I. Piatetski-Shapiro of Tel Aviv and Yale Universities, C. C. Hsiung of Lehigh University, A. Casson of the University of California at Los Angeles, Wu-chung Hsiang of Princeton University, Michael Rabin of the Hebrew University of Jerusalem and Harvard University, and E. Freitag of Heidelberg and Harvard Universities.

The members' activities were not limited to seminars and lectures but resulted also in a large number of preprints in fields ranging through logic, algorithmic complexity, number theory, algebraic topology, algebraic geometry, differential geometry and the partial differential equations of mathematical physics.

The School of Mathematics

Members, Visitors and Assistants, 1980-81

In the section which follows, the information was obtained from material provided by the members, visitors and assistants.

Members

Selman Akbulut. *Differential and geometric topology.*
Born 1949, Turkey. University of California at Berkeley, BS 1971, MA 1972, PhD 1975.
Institute for Advanced Study, member 1975-76; University of Wisconsin at Madison, assistant professor 1976-78; Rutgers University, assistant professor 1978-80.

Greg William Anderson. *Automorphic forms; cohomology of arithmetic discontinuous groups.*
Born 1955, Fort Belvoir, Virginia. Stanford University, BS 1977; Princeton University, PhD 1980.

R. Balasubramanian. *Algebraic number theory.*
Born 1951, Madras, India. University of Madras, BS 1970, MA 1972; University of Bombay, PhD 1979.
Tata Institute of Fundamental Research, Bombay, fellow 1976- .

Steven L. Batterson. *Dynamical systems.*
Born 1950, Newport News, Virginia. College of William and Mary, BA 1971; Northwestern University, MA 1972, PhD 1976.
Emory University, assistant professor 1976- .

Eric D. Bedford. *Several complex variables.*
Born 1947, Salt Lake City, Utah. University of Illinois, BS 1969; University of Michigan, PhD 1974.
New York University, Courant Institute, Courant instructor 1974-76; Princeton University, assistant professor 1976- .

Glen E. Bredon. *Topological transformation groups.*
Born 1932, Fresno, California. Stanford University, BS 1954; Harvard University, MA 1955, PhD 1958.
University of California at Berkeley, assistant professor, professor, 1960-68; Institute for Advanced Study, member 1966-67; Rutgers University, professor 1968- .

Clifford J. Earle, Jr. *Complex analysis.*
Born 1935, Racine, Wisconsin. Swarthmore College, AB 1957; Harvard University, MA 1958, PhD 1962.
Harvard University, instructor and research fellow in mathematics 1962-63; Institute for Advanced Study, member 1963-65; Cornell University, assistant professor 1965-66, associate professor 1966-69, professor 1969- .

Michael G. Eastwood. *Several complex variables and twistor theory.*
Born 1952, Whitehaven, Cumberland, England. University of Oxford, BA 1973; Princeton University, PhD 1976.
Warwick University, temporary lecturer in mathematics 1976-77; University of Oxford, junior lecturer in mathematics 1977-80, Jesus College, college lecturer 1977-79, Wolfson College, junior research fellow 1979- .

Michael H. Freedman. *Topology; geometry.*
Born 1951, Los Angeles, California. Princeton University, PhD 1973.
University of California at Berkeley, lecturer 1973-75; Institute for Advanced Study, member 1975-76; University of California at San Diego, assistant professor 1976-79, associate professor 1979- .

Eric M. Friedlander. *Algebraic K-theory, algebraic geometry, and algebraic topology.*
Born 1944, Santurce, Puerto Rico. Swarthmore College, AB 1965; Massachusetts Institute of Technology, PhD 1970.
Princeton University, instructor, lecturer, assistant professor, 1970-75; Institut des Hautes Etudes Scientifiques, United States-France

Exchange of Scientists Fellow 1974; Northwestern University, associate professor 1975; Universities of Cambridge and Oxford, SRC visiting senior lecturer 1977-78.

Murray Gerstenhaber. *Algebraic geometry.*

Born 1927, Brooklyn, New York. Yale College, BA 1948; University of Chicago, MA 1949, PhD 1951; University of Pennsylvania, JD 1973.

University of Pennsylvania, assistant professor 1953-58, associate professor 1958-61, professor 1961- , chairman, department of mathematics 1973-75; Bucknell University, distinguished visiting professor 1977.

Basilis Gidas. *Mathematical physics.*

Born 1941, Exarchos-Locridos, Greece. National Technical University of Greece, BS 1965; University of Michigan, MA 1967, PhD 1970.

University of Michigan, research associate 1970-72; University of Washington, assistant professor 1972-75; University of Bielefeld, visiting assistant professor 1975-76; Rockefeller University, guest investigator 1976-79; Institute for Advanced Study, member 1979-80, second term 1980-81.

Robert L. Griess, Jr. *Group theory.*

Born 1945, Savannah, Georgia. University of Chicago, BS 1947, MA 1968, PhD 1971.

University of Michigan, Hildebrandt research instructor 1971-73, assistant professor 1973-74, 1975-76, associate professor 1976- ; Rutgers University, visiting assistant professor 1974-75.

James L. Hafner. *Analytic number theory.*

Born 1954, Seaside, California. University of Santa Clara, AB 1975; University of Illinois, MA 1976, MS 1980, PhD 1980.

Nicholas W. Hanges. *Linear partial differential equations.*

Born 1949, Bridgeport, Connecticut. City College of New York, BA 1971; Purdue University, MA 1973, PhD 1976.

Purdue University, instructor 1977; Institute for Advanced Study, member 1977-78; Rutgers University, Hill assistant professor 1978- .

Rebecca Ann Herb. *Harmonic analysis on semisimple Lie groups.*

Born 1948, Madison, Wisconsin. University of Oregon, BA 1969, MA 1970; University of Washington, PhD 1974.

Institute for Advanced Study, member 1974-75; University of Chicago, Dickson instructor 1975-77; University of Maryland, assistant professor 1977- .

Henry Hermes. *Differential geometric methods in control theory.*

Born 1933, Jersey City, New Jersey. New Jersey State College at Montclair, BA 1954; University of New Mexico, MA 1958, PhD 1961.

Martin Marietta Corporation, research scientist 1961-63; Research Institute for Advanced Study (RIAS), member 1963-64; Brown University, assistant professor 1964-66; University of Colorado, associate professor 1966-69, professor 1969- ; University of Würzburg, visiting professor 1973-74.

Haruzo Hida. *Number theory; arithmetic theory of automorphic functions.*

Born 1952, Osaka, Japan. Kyoto University, BS 1974, MA 1976.

Hokkaido University, assistant 1976- ; Institute for Advanced Study, member 1979-80.

Douglas N. Hoover. *Logic; probability.*

Born 1953, Hamilton, Ontario, Canada. University of Toronto, BA 1975; University of Wisconsin, PhD 1978.

Princeton University, visiting fellow 1978-79; Yale University, visiting fellow 1979-80.

Steven E. Hurder. *Differential geometry and differential topology.*

Born 1953, Baton Rouge, Louisiana. Rice University, BA 1975; University of Illinois, PhD 1980.

James A. Jenkins. *Function theory.*

Born 1923, Toronto, Canada. University of Toronto, BA 1944, MA 1945; Harvard University, PhD 1948.

Johns Hopkins University, assistant professor 1950-54; University of Notre Dame, associate professor 1954-56, professor 1956-59; Washington University, professor 1959- .

Peter J. Kahn. *Differential and algebraic topology.*

Born 1939, Santiago, Chile. Oberlin College, AB 1960; Princeton University, PhD 1964.

University of California at Berkeley, instructor 1963-65; Cornell University, assistant professor 1965-70, associate professor 1970-76, professor 1976- ; Institute for Advanced Study, member 1969-70, 1970-71; University of Heidelberg, visiting professor 1974-75.

Franz W. Kamber. *Differential topology and differential geometry.*

Born 1936, Olten, Switzerland. University of Zurich, PhD 1965.

Swiss Federal Institute of Technology, Mathematics Research Institute, research assistant 1965; University of California at Berkeley, Miller Institute for Basic Research in Science, research fellow 1965-67; Institute for Advanced Study, member 1967-68; University of Illinois at Urbana, associate professor 1968-70, professor 1970- , Center for Advanced Study, associate member 1979-80; University of Heidelberg, visiting professor, summer 1973.

Monsur A. Kenku. *Algebraic number theory.*

Born 1942, Lagos, Nigeria. University of Ibadan, BSc 1965; University of Oxford, diploma in advanced mathematics 1967, DPhil 1968.

University of Ibadan, lecturer, senior lecturer, 1968- ; University of California at Berkeley, visiting assistant professor 1972-73.

Donald T. Kersey. *Algebraic number theory.*

Born 1955, Belleville, Ontario, Canada. McMaster University, BSc 1976; Yale University, PhD 1980.

Joseph J. Kohn. *Complex manifolds.*

Born 1932, Prague, Czechoslovakia. Massachusetts Institute of Technology, BS 1953; Princeton University, MA 1954, PhD 1956.

Princeton University, instructor 1956-57, professor 1968- ; Institute for Advanced Study, member 1957-58, 1961-62, 1976-77; Brandeis University, assistant professor 1958-61, associate professor 1962-64, professor 1964-68.

Grigori Kolesnik. *Analytic number theory.*

Born 1937, Kiev, USSR. Moscow State University, MA 1965; University of Kiev and Moscow State University, PhD 1972.

University of California at Los Angeles, lecturer and research mathematician 1975-76; California Institute of Technology, instructor 1976-77; State University of New York at Buffalo, assistant professor 1977-78; University of Texas at Austin, assistant professor 1978- .

Ulrich Koschorke. *Differential topology; homotopy theory.*

Born 1941, Königsberg, Germany. University of Bonn, Diplom. 1966; Brandeis University, PhD 1968.

Rutgers University, assistant professor 1968-74; Queens College, City University of New York, associate professor 1974-75; University of Bonn, guest researcher 1971-72, guest professor 1973-77; University of Siegen, professor 1977- .

Steven G. Krantz. *Harmonic analysis; several complex variables.*

Born 1951, San Francisco, California. University of California at Santa Cruz, BA 1971; Princeton University, PhD 1974.

University of California at Los Angeles, assistant professor 1974- ; Université de Paris-Sud, visiting professor, fall 1977.

Stephen S. Kudla. *Automorphic forms and number theory.*

Born 1950, Caracas, Venezuela. Harvard College, AB 1971; State University of New York at Stony Brook, MA 1972, PhD 1975.

Institute for Advanced Study, member 1975-76; University of Maryland, visiting assistant professor 1976-77, assistant professor 1977- ; Yale University, visiting assistant professor, fall 1979.

Akira Kurihara. *Automorphic functions.*

Born 1949, Tokyo, Japan. University of Tokyo, BSc 1973, MSc 1975, PhD 1978.

Japan Society for the Promotion of Science, fellow 1978-79; Japan Women's University, associate professor 1979- .

Ronnie Lee. *Differential topology.*

Born 1942, China. University of Michigan, PhD 1968.

Yale University, assistant professor, professor, 1970- ; Institute for Advanced Study, member 1968-69, 1969-70, first term 1973-74.

James I. Lepowsky. *Lie theory.*

Born 1944, New York, New York. Harvard College, AB 1965; Massachusetts Institute of Technology, PhD 1970.

Brandeis University, lecturer and research associate 1970-72; Yale University, assistant professor 1972-77, director of undergraduate studies in mathematics 1974-75, junior faculty fellow 1975-76; Institute for Advanced Study, member 1975-76; Rutgers University, associate professor 1977- ; Université de Paris VI, maître de conférences associé.

Benjamin Lichtin. *Microlocal analysis and the Gauss-Manin connection.*

Born 1953, Cincinnati, Ohio. University of Cincinnati, BS 1972; Ohio State University, MA 1973, PhD 1978.

Ohio State University, lecturer 1978-79; Institute for Defense Analyses, communications research division, technical staff member 1979-80.

Ming-Chit Liu. *Analytic number theory and approximation theory.*

Born 1937, Macau. The Chinese University of Hong Kong, BSc 1965; University of Hong Kong, MSc 1969, PhD 1973.

University of Hong Kong, assistant lecturer 1971-73, lecturer 1973- ; University of Cambridge, Commonwealth academic staff fellow 1974-75.

William H. Meeks III. *Minimal surfaces and topology.*

Born 1947, Washington, DC. University of California at Berkeley, BA 1971, MA 1973, PhD 1975.

University of California at Los Angeles, Hedrick assistant professor 1975-77; Instituto de Matemática Pura e Aplicade (IMPA), Rio de Janeiro, 1977-78, 1979-80; Stanford University, visiting assistant professor 1978-79.

Roberto J. Miatello. *Harmonic analysis on semisimple Lie groups.*

Born 1947, Buenos Aires, Argentina. Rutgers University, PhD 1976.

Instituto de Matemática Astronomía y Física (IMAF), Cordoba, Argentina, instructor 1970-72; Rutgers University, instructor, fall 1976; UFPE, Recife, assistant professor 1977- ; Universidade Federal de Pernambuco, research fellow 1978-80.

Luis Montejano. *Geometric topology.*

Born 1951, Mexico City, Mexico. National University of Mexico, BS 1975; University of Utah, PhD 1980.

Maruti Ram P. Murty. *Number theory.*

Born 1953, Guntur, India. Carleton University (Ottawa), BSc 1976; Massachusetts Institute of Technology, PhD 1980.

Joseph A. Neisendorfer. *Algebraic topology.*

Born 1945, Chicago, Illinois. University of Chicago, BS 1967; Princeton University, MA 1968, PhD 1972.

University of Notre Dame, assistant professor 1972-76; Syracuse University, assistant professor 1976-78; Fordham University, assistant professor 1978- ; Institute for Advanced Study, member 1979-80.

Junjiro Noguchi. *Function theory in several complex variables and complex analytic geometry.*

Born 1948, Yokosuka, Japan. Tokyo Institute of Technology, BS 1971, MA 1973; Hiroshima University, PhD 1978.

Hiroshima University, assistant 1973-78; Osaka University, assistant professor 1978- .

Frederick G. H. Norwood. *Knot theory.*

Born 1942, New Orleans, Louisiana. University of Southwestern Louisiana, BS 1966, PhD 1979; University of California at Riverside, MA 1969.

Louisiana State University at New Orleans, instructor 1967-72; University of Southwestern Louisiana, instructor 1979-80.

Carlos F. B. Palmiera. *Differential topology with emphasis on foliations.*

Born 1947, Brazil. Pontifíca Universidade Católica do Rio de Janeiro, BA 1969, MA 1971; Instituto de Matemática Pura e Aplícade, PhD 1976.

Pontifíca Universidade Católica do Rio de Janeiro, assistant professor 1971-76, associate professor 1976- .

Viktor Y. Pan. *Numerical analysis; computer science.*

Born 1939, Moscow, USSR. Moscow State University, PhD 1964.

Moscow State University, instructor 1961-64; Machines, Moscow, junior researcher 1964-65; Institute of Electronic Control, senior researcher 1965-69; Academy of Science of USSR, Institute of Economics, senior researcher 1969-76; IBM Research Center, visiting scientist 1977-79; State University of New York at Albany 1979-80.

Dorin M. Popescu. *Artin's approximation theory and deformations of algebraic varieties.*

Born 1947, Rumania.

University of Bucharest, assistant 1969-79;

INCREST, researcher 1979, senior researcher 1979- .

Gopal Prasad. *Semisimple algebraic groups.*
Born 1945, Ghazipur, U.P., India. Magadh University, BS 1963; University of Patna, MA 1965; University of Bombay, PhD 1976.
Tata Institute of Fundamental Research, fellow 1973-75, reader 1975-79, associate professor 1979- ; Institute for Advanced Study, member 1973-74.

Mirko Primc. *Representation theory of semisimple Lie groups.*
Born 1948, Zagreb, Yugoslavia. University of Zagreb, BS 1971, MA 1974, PhD 1978.
University of Zagreb, instructor 1971-79, assistant professor 1979- .

Doraiswamy Ramachandran. *Probabilistic measure theory.*
Born 1945, Tiruchirapalli, India. University of Madras, BS 1965; Indian Statistical Institute, MStat 1968, PhD 1974.
Indian Statistical Institute, senior research fellow 1974-75, lecturer 1977- ; University of Dar-es-Salaam, senior lecturer 1975-77; University of the Philippines, associate professor 1979- .

Charles Rockland. *Partial differential equations.*
Born 1947, Bad Wörishofen, West Germany. Harvard College, AB 1969; Princeton University, PhD 1972.
Massachusetts Institute of Technology, Moore instructor 1972-74; Brandeis University, assistant professor 1974- ; California Institute of Technology, visiting associate 1978-79.

Asmus L. Schmidt. *Number theory.*
Born 1936, Vodder, Denmark. University of Copenhagen, cand. mag. 1960, mag. scient. 1960.
University of Copenhagen, amanuensis 1964-71, lektor 1966-71, afdelingsleder 1971- .

Joachim Schwermer. *Automorphic forms; number theory.*
Born 1950, Kulmbach, West Germany. Aloisiuskolleg, Bad Godesberg, Arbitur 1969; Universität Bonn, Dipl. Math. 1974, Dr. rer. nat. 1977.
Universität Bonn, Math. Institut, Wissenschaftliche Hilfskraft 1976-77, Sonderforschungsbereich Theoretische Mathematik 1977-79, Math. Institut, Wissenschaftlich. Assistent 1979- .

Eira J. Scourfield. *Analytic number theory.*
Born 1935, London, England. University of London, BSc 1956; University of Exeter, MSc 1959; University of Glasgow, PhD 1962.
Westfield College, University of London, lecturer 1962- ; Institute of Mathematics, University of Wrocław, researcher, fall 1973; University of Nottingham 1974; Institute for Advanced Study, member, second term 1980-81.

John D. Smillie. *Affine structures on manifolds.*
Born 1953, Boston, Massachusetts. New College, AB 1974; University of Chicago, MA 1975, PhD 1977.
Princeton University, instructor 1977-80.

Donald E. Smith. *Transformation groups.*
Born 1954, Passaic, New Jersey. Princeton University, BA 1976; University of Chicago, MA 1977, PhD 1980.

Penny Smith. *Global analysis; mathematical physics.*
Born 1952, Bronx, New York. Brooklyn Polytechnic Institute, BS 1974, MA 1977, PhD 1978.
University of California at Los Angeles, adjunct assistant professor 1978-80.

Richard E. Sot. *Algebraic geometry.*
Born 1948, Sewickley, Pennsylvania. University of Toledo, BS 1970; McMaster University, MS 1972; University of Rochester, PhD 1980.

Neal W. Stoltzfus. *Witt classification of isometric structures.*
Born 1946, USA. University of Illinois, BS 1967; Princeton University, MS 1969, PhD 1973.
Louisiana State University, assistant professor 1973-78, associate professor 1979- ; Université de Geneve, professeur invité 1978-79.

Michio Suzuki. *Group theory.*
Born 1926, Chiba, Japan. University of Tokyo, BS 1948, PhD 1952.
University of Illinois, professor 1959- .

Gadde A. Swarup. *Topology: 3-manifolds.*
Born 1941, Pesarlanka, A.P., India. Osmania University, BS 1962; University of Madras, MA

1964; University of Bombay, PhD 1971.

Tata Institute of Fundamental Research, reader 1973- ; IHES, FIM and ETH, fellow 1975-76; Indiana University, visiting associate professor 1979-80.

Kazuaki Taira. *Semi-groups and boundary value problems.*

Born 1946, Tokyo, Japan. University of Tokyo, BS 1969, PhD 1976; Tokyo Institute of Technology, MA 1972.

Université de Paris XI, fellow 1976-78; University of Tsukuba, assistant professor 1978- .

Mitsuhiro Takeuchi. *Algebra: Hopf algebras, group schemes, algebraic groups.*

Born 1930, Ueda, Nagano, Japan. University of Tokyo, AB 1969, MA 1971, PhD 1975.

Tokyo Metropolitan University, assistant professor 1971-74; University of Tsukuba, lecturing professor 1974- ; Institute for Advanced Study, member 1979-80.

Ryuji Tsushima. *Algebraic geometry and automorphic functions.*

Born 1952, Osaka, Japan. University of Tokyo, BS 1975, MA 1977, PhD 1980.

Gakushuin University, assistant 1977- .

Carlo Viola. *Number theory.*

Born 1943, Rome, Italy. University of Turin, laurea in mathematics 1966.

University of Pisa, Mathematical Institute, assistente ordinario 1970-79, professore incaricato 1979- .

Karen Vogtmann. *Algebraic K-theory.*

Born 1949, Pittsburg, California. University of California at Berkeley, AB 1971, PhD 1977.

University of Michigan, visiting assistant professor 1977-79; Brandeis University, visiting assistant professor 1979- .

Zhe-xian Wan. *Group theory.*

Born 1927, Shantong province, China. Tsinghua University, BS 1948.

Tsinghua University, assistant 1948-50; Academia Sinica, Institute of Mathematics, assistant 1950-52, assistant researcher 1952-64, assistant research fellow 1964-78, research fellow 1978- .

Robert L. Wilson. *Lie algebras.*

Born 1946, Washington, DC. American University, AB 1965; Yale University, PhD 1969.

New York University, Courant Institute, Courant instructor 1969-71; Rutgers University, assistant professor 1971-75, associate professor 1975- ; Yale University, visiting fellow 1976-77.

William R. Zame. *Several complex variables.*

Born 1945, Long Beach, New York. California Institute of Technology, BS 1965; Tulane University, MA 1967, PhD 1970.

Rice University, Griffith C. Evans instructor 1970-72; State University of New York at Buffalo, assistant professor 1972-76, associate professor 1976- ; Tulane University, associate professor 1975-78.

Visitors

Daniel M. Burns, Jr. *Complex analysis and algebraic geometry.*

Born 1946, Brooklyn, New York. University of Notre Dame, AB 1967; Massachusetts Institute of Technology, PhD 1972.

Princeton University, instructor 1972- ; Institute for Advanced Study, member 1975-76.

S. Chowla. *Number theory.*

Born 1907, London, England. Punjab University, MA 1928; University of Cambridge, PhD 1931.

Benares Hindu University, reader 1932-33; Andhra University (Waltair), reader 1933-36; Government College (Lahore), professor 1936-47; University of Kansas, visiting professor 1949-52; University of Colorado, professor 1952-63; Pennsylvania State University, professor 1963-75, professor emeritus 1975- ; Institute for Advanced Study, member second term 1947-48, 1957-58, 1970-71, visitor 1971-72, 1972-73, summer 1974, summer 1978, summer 1980.

Amassa Fauntleroy. *Algebraic geometry and algebraic groups.*

Born 1945, Baltimore, Maryland. Northwestern University, PhD 1970.

De Paul University, instructor 1968-69; University of Illinois, assistant professor 1972-78, associate professor 1978- .

Basilis Gidas. *See page 38 for biographical entry.*

Institute for Advanced Study, visitor, first term 1980-81.

Loo-Keng Hua. *Number theory.*
Academia Sinica, Institute of Mathematics, director.

Jürgen Jost. *Harmonic mappings and differential geometry.*
Born Münster-W., Germany. Universität Bonn, Diplom.-Math. 1980, Dr. rer. nat. 1980.

Henry C. King. *Topology, especially of singularities and real algebra sets.*
Born 1948, Corning, New York. Brown University, BS 1969; University of California at Berkeley, MS 1973, PhD 1974.
University of Maryland at College Park, assistant professor 1976- ; Institute for Advanced Study, member 1974-75, 1975-76.

Reinhold Remmert. *Several complex variables.*
Born 1930, Osnabrück, Germany. University of Münster, PhD 1954.
University of Münster, dozent 1956-58; University of Michigan, visitor 1958-59; Institute for Advanced Study, member 1959-60; University of Erlangen, professor 1960- ; Westfälische Wilhelms-Universität, professor.

Mark E. Sheingorn. *Automorphic forms.*
Born 1944, New York, New York. Dartmouth College, AB 1965; University of Wisconsin, MA 1967, PhD 1970.
Hofstra University, assistant professor 1972-73; City University of New York, Baruch College, assistant professor 1974-78, associate professor 1978- ; Institute for Advanced Study, second term 1975-76.

Catherine M. Wagner. *Mathematical logic.*
Born 1945, Schenectady, New York. Miami University (Ohio), AB 1967; Wright State University, MS 1971; Cornell University, PhD 1979.
Cornell University, instructor 1979- .

Yan-Lin Yu. *Geometry.*
Academia Sinica, Institute of Mathematics, professor.

Assistants

Robert A. Bartnick. *Differential geometry.*
Born 1956, Melbourne, Australia. University of Melbourne, BS 1978, PhD 1980.
Institute for Advanced Study, assistant to Professor Shing-Tung Yau.

Richard G. Klotz. *Differential geometry.*
Born 1954, Paterson, New Jersey. Harvard College, BS 1976; Stanford University, MS 1978.
Stanford University, teaching fellow 1976- ; Institute for Advanced Study, assistant to Professor Shing-Tung Yau.

James Mackraz. *Differential geometry.*
Born 1955, Cincinnati, Ohio. University of Michigan, BS 1978; Stanford University, MS 1980.
Institute for Advanced Study, assistant to Professor Shing-Tung Yau.

The School of Natural Sciences

Faculty

Stephen A. Adler
(New Jersey Albert Einstein Professor)
John N. Bahcall
Roger Dashen
Freeman J. Dyson
Marshall N. Rosenbluth

Visiting Professors

Tullio Regge
Maarten Schmidt

Permanent Member

Julian H. Bigelow

Members with Long-term Appointments

Charles R. Alcock
Bruce T. Draine
Herman H. Goldstine
Otto E. Neugebauer
Scott D. Tremaine

The School of Natural Sciences

In the early years of the Institute there was no formal division between mathematics and physics. Einstein himself and other great physicists such as Pauli, Dirac and Bohr who came as members belonged to the School of Mathematics. The School of Mathematics had Hermann Weyl, equally great as mathematician and physicist, to hold the two disciplines together. Unfortunately Weyl had no successor. He was the last in the great line of mathematician-physicist-philosophers which began with Descartes and Newton. After Weyl's death, his dream of unifying mathematics and physics within the School of Mathematics was gradually abandoned.

When J. Robert Oppenheimer became Director of the Institute in 1947, he began immediately to collect a group of young physicists working in the new areas of particle physics that had come into flower in the early postwar years. C. N. Yang and T. D. Lee were appointed professors, and they gave vigorous leadership to the work in particle physics. Yang was a member of the Institute's Faculty when he and Lee did the work for which they received the Nobel Prize in physics. A number of visiting members and professors of the Institute have received Nobel Prizes and other major awards.

The twenty years from 1960 to 1980 were a period of transition for the work in the natural sciences at the Institute. The particle physics group was enlarged first by the addition of astronomers led by Bengt G. Strömgren. After years of de facto independence, the School of Natural Sciences was formally established in 1966. The Faculty of the School which Oppenheimer had assembled began to disperse in the 1960s, with only two professors—Freeman J. Dyson and Tullio Regge—remaining from that period. Between 1967 and 1971, four new professors were appointed—Marshall N. Rosenbluth in plasma physics, Stephen L. Adler and Roger Dashen in high energy physics, and John N. Bahcall in astrophysics. The present Faculty gives the School both a wider range and a more intimate engagement with experimental work than was the case in earlier years.

Despite the dramatic change in the composition of the Faculty, the School continues to function very much in the manner and style which Oppenheimer had established. Members and visitors are brought to the Institute each year, chosen by the School's Faculty and reflecting either their interests or their sense of interesting intellectual areas, even if they are not directly involved in a given field itself. Members and Faculty alike are free to devote their time to their own research, with mutual criticism and frequent collaboration the normal pattern, but there are no formal rules or requirements. Seminars are established as needed, often jointly with the faculty of nearby universities, and there are scheduled and unscheduled luncheons for extensive discussion. Since physics is basically an experimental science, the Faculty maintains substantial connections to scientific institutions elsewhere, whether the major national laboratories (such as the Stanford Linear Accelerator Center, Brookhaven or Fermilab) or optical and radio telescope facilities (such as those at Kitt Peak, Green Bank or Socorro) or equivalent institutionalized centers in other subdisciplines of the physical sciences. Additionally, Faculty members frequently lecture at various universities or, as consultants to government or industry, participate in the process that sets the direction and develops the instrumentation for the advancing frontiers of science. This balances the theoretical orientation of the Institute for Advanced Study and offsets the absence here of laboratories and experimental facilities vital to the whole of science.

Bounded by design and tradition as well as by budgetary realities, the School has come to concentrate on three fundamental areas: the physics of the very small (meaning elementary particle physics, high energy physics and field theory), the physics of the very large (astrophysics and general relativity) and the physics of very complex finite systems (statistical mechanics and the many-body problem as well as plasma physics).

Within the category embraced by the physics of the very small is a family of fascinating problems and processes. The problem of resolving the increasingly finer properties of the structure of matter has called for smaller and smaller probing fingers or wavelengths. In turn, this has demanded larger and larger probing energies so that high energy physics, the physics of the big machines, has become synonymous with the physics of elementary particles. From a theoretical point of view this requires the simultaneous reconciliation of quantum mechanics with Einstein's special relativity, that is, of defining a reality in which the transformation of matter into energy holds, according to the famous formula $E=mc^2$, even though according to quantum mechanics there is an uncertainty in determining the energy of a system because an arbitrarily large number of particles is involved, which leads to systems with infinite degrees of freedom. Quantum electrodynamics, which is the system describing the interaction between electrons and photons (or in field language, the interaction of the electron with the electromagnetic field), is one response to this situation. Unfortunately, it has not proved adequate to the task of dealing with the four basic types of particle interactions: the electromagnetic, the strong forces which hold the nucleus together, the weak forces responsible for β-decay in radioactivity, and gravitation. At present, the work in particle physics and field theory is concentrated on a theory which is a generalization of quantum electrodynamics, called quantum chromodynamics, which in turn is believed to be one of the best candidates for an acceptable theory of the strong interaction force. The history and discussion of modern particle theory at the Institute are thus attempts to find ways of developing a satisfactory theoretical understanding of particles and their interactions.

In dealing with the physics of the very large, which is the second major area of interest within the School of Natural Sciences, the astronomer faces problems whose conditions are separate and distinct from the general practice of science. Unlike the physicist who deals with the very small, the astronomer has no access to controlled laboratory experiments. His knowledge is derived from the careful study of signals from distant objects, which up to the Second World War were exclusively optical in character. The new technologies which were spawned during the war bloomed rapidly in the years that followed, broadening the spectrum of observable phenomena to include the radio spectrum, the infrared, the ultraviolet, x-ray and gamma-ray astronomy, and even the possibility of neutrino and gravitational radiation.

Changing observational methods have also led to the discovery or prediction of new astronomical objects such as neutron stars (which Oppenheimer predicted), black holes, pulsars (later identified as neutron stars), quasi-stellar objects such as quasars as well as the continuing study of old familiars such as novae, supernovae and white dwarfs. Of equal interest has been the study of the interstellar medium, important because of its influence on the transmission of radiation signals, and the cosmic black body radiation, which is believed to be the remains of radiation which once filled the universe in an earlier, hotter stage of its expansion. For astrophysicists, general relativity theory thus assumes great importance as they come to grips with the gravitational effects of very large masses. Small well-known deviations from Newtonian predictions within the solar system have been delineated by general relativity theory, but its greatest importance lies in the physics of neutron stars, black holes and theories of cosmic evolution. These revolutionary developments in astronomy have rekindled the interest in general relativity, so that Einstein's work remains at the edge of contemporary science as a vigorous research frontier.

Under these rather sweeping rubrics, the work of the School of Natural Sciences concentrates on particular areas: neutrino astronomy, galactic evolution, Cepheid variables, supernovae, compact x-ray sources, neutron stars and black holes. Additionally, quasars as the most distant objects, and the recently discovered rings of Uranus as some of the nearest, have occupied the research attention of the astrophysics group. The group also specializes in predicting what the Space Telescope (to be launched about 1984) will see at the very faint levels of light and in the new parts of the spectrum that will be accessible from this first permanent international observatory in space.

The third major subject, the physics of very complex finite systems, divides into two areas. These are statistical mechanics and the many-body problem, which is concerned with various physical properties of matter in bulk, such as stability, thermodynamic properties and the like; and plasma physics, which examines the special properties of matter present at very high temperatures when the atoms have been stripped of their electrons by concentrated thermal collisions. The study of such plasmas has a double relevance for they are both astrophysically interesting and terrestrially important, relating in the first instance to the structure of stars and in the second to the possible exploitation of nuclear fusion as a useful energy source. Two patterns of research have developed on this subject at the Institute, reflecting the manner in which plasmas of appropriate density and confinement are created. One set of interests deals with magnetically confined plasmas, where the containment is brought about by different geometric arrangements of magnetic fields; a second set deals with inertially confined plasmas, where the plasma confinement occurs as the result of an implosion induced by laser irradiation.

Academic Activities, 1980-81

High Energy Physics and Field Theory

Work in high energy physics and field theory in 1980-81 covered a variety of topics, including supersymmetry, the strong CP and axion problems, lattice gauge theories, quark confinement and "bag" formation, quantum gravity and vacuum decay.

Julius Wess, on leave for the year at the Institute, taught a spring semester course in supersymmetry at Princeton University, which was attended by many of the School's members. He is turning his course notes into a text on supersymmetry, and it is being issued in sections as an Institute preprint. In collaboration with Burt A. Ovrut, Wess studied the Feynman rules for spontaneously broken supersymmetric theories and the question of radiatively breaking supersymmetry. They discovered an interesting mechanism in which the presence of a cosmological term, in combined supersymmetry-supergravity theories, leads to a natural breaking of supersymmetry.

Michael Dine, Willy Fischler and Srednicki found a way of constructing unified models of particle forces in which strong CP violations are eliminated by virtue of an extra U(1) symmetry, but in which the resulting axion has couplings which are suppressed by a large factor, as required by current experimental bounds. Their work has attracted considerable attention and has stimulated renewed efforts aimed at constructing grand unified theories which incorporate the generation structure of the quarks and leptons.

Extensive investigations of the properties of lattice gauge theories were conducted by Stuart A. Samuel and Frederic L. Green. Using a new order parameter for the U(1) theories, they were able to prove the existence of a large-N phase transition in three and four dimensions, and calculated the critical couplings in these models to two decimal places. Similar calculations were also done for the chiral models in two dimensions.

Roger Dashen, along with Callan and Gross of Princeton University, set out to compute an approximation to the fixed point lattice action in QCD. This can be done by integrating a continuum theory while holding link variables fixed. This work is essentially complete but not yet published. During the spring term, Dashen was on leave at the Ecole Normale Supérieure in Paris. He gave the de Shalit Memorial Lecture at the Weizmann Institute during a visit to Israel in April.

Stephen L. Adler gave a proof that a non-Abelian analog of electrostatics, in which the classical action is replaced by the leading logarithm renormalization-group improved effective action, leads to linear confinement at large source separations. Adler also showed that transformation of the leading-logarithm model to flux- or stream-function form leads to a stable numerical method, from which one can see that there is a "bag"-like confinement domain. In collaboration with Tsvi Piran, he is analyzing the structure of this model in greater detail, both analytically and numerically. John R. Hiller has worked out the formalism needed to calculate spin-dependent $q\bar{q}$ forces in this approach to confinement.

In the area of quantum gravity, Adler gave the eleventh Schild Memorial Lectures at the University of Texas at Austin, on the topic of "Einstein Gravity as a Symmetry Breaking Effect in Quantum Field Theory." He subsequently expanded the lecture notes into a review article which will appear in the Reviews of Modern Physics.

Working with Perry, Brosl Hasslacher developed an interesting spin model for quantum gravity in two space and one time dimension. This work elaborates on earlier ideas of Regge on the connection between angular momentum recoupling coefficients and general relativity.

Emil Mottola and Alan S. Lapedes made a systematic study of metastable quantum systems. Using the idea of complex paths, they were able to develop a consistent semi-classical approximation to the functional integral representation of the partition function for a system with quantum tunneling behavior. Their formalism (which draws heavily on earlier work at the Institute by Dashen, Hasslacher and Neveu) is applicable at both zero and finite temperature, and automatically incorporates the correct boundary conditions on the eigenfunctions of the fluctuation operator.

Mathematical Physics and Statistical Mechanics

In the year 1980-81 a group of four scholars in the School—Joel L. Lebowitz, Izumi Ojima, Gert Roepstorff and Colin J. Thompson—was working on problems of statistical mechanics. Lebowitz had some success in clarifying the old but still unsolved problem of deriving the irreversible macroscopic behavior of fluids from the reversible microscopic behavior of their constituent molecules. Roepstorff and Thompson solved completely some non-trivial models of ferromagnets and spin-glasses. Ojima worked on applications of statistical mechanical techniques to the theory of gauge fields. Freeman J. Dyson was investigating some kinetic equations which describe the statistical behavior of systems of molecules, with a view to understanding some aspects of pre-biotic evolution.

Astrophysics and Astronomy

John N. Bahcall continued his four-year study of the uncertainties in the predicted solar neutrino fluxes (and the capture rates in solar neutrino experiments). Improved estimates for the standard solar model were obtained and the partial derivatives of the fluxes with respect to all the important parameters were calculated. This work is being carried out in collaboration with P. Parker (Yale University), Stephen S. Lubow (the Institute for Advanced Study) and R. Ulrich (the University of California at Los Angeles). Bahcall also showed that the measurements of solar oscillations are complementary to the measurements of solar neutrinos: oscillation periods in the five-minute range are dominated by surface phenomena while neutrino measurements refer to the innermost region of the Sun. Bahcall is part of an international collaboration (with researchers at Brookhaven National Laboratory, the Max Planck Institut in Heidelberg and the Weizmann Institute in Rehovot) to perform another solar neutrino experiment using ^{71}Ga as a target. The proposal of this collaboration was favorably reviewed by a select committee headed by G. Seaborg.

Bahcall and Raymond M. Soneira continued their collaborative work on the stellar content of the Galaxy. Star counts in seventeen selected fields were predicted and are available for comparison with future observations; a number of important parameters of galactic structure can be determined by studying these fields observationally and comparing with the predicted counts. Very wide binaries (~ 1 light year separation) were discovered by Bahcall and Soneira using the techniques of correlation functions.

Maarten Schmidt (together with R. Green of the University of Arizona) analyzed their catalog of quasars—the most extensive yet compiled—and were able to show the rate at which these enigmatic objects evolve depends strongly on their luminosity as well as their distance. This result is a new and important contribution to quasar phenomenology.

John L. Tonry and Scott D. Tremaine organized a one and one-half day workshop on the dynamics of the Virgo Supercluster. The study of motions of galaxies in this supercluster, which extends roughly from our Galaxy (at one edge) for 30 megaparsecs, yields perhaps the best estimate of the mean density of the universe. At least five groups have analyzed this system, with widely differing results; the purpose of the workshop was to permit discussion and evaluation of these results in an informal open forum. The meeting was successful (about forty experts from throughout the country attended) and will stimulate much future work.

In collaboration with J. P. Ostriker (Princeton University), Tremaine constructed models of the nucleus of M31. Although there are excellent observations of this nucleus (due to stratoscope balloon flights in the early 1970s), so far no satisfactory model has been constructed which is consistent with the balloon and ground-based observations. Tremaine has found a wide range of possible models, with mass-to-light ratios (M/L), ranging from 50 to near zero in solar units; the similarity of the spectra of the nucleus and the surrounding bulge suggests that the proper choice of M/L ~ 5 − 10, which is what is observed in the bulge.

Tremaine and Peter Goldreich (California Institute of Technology) have largely completed their theoretical work on the dynamics of planetary rings; the major event in this area during 1980 was the encounter of the Voyager I spacecraft with Saturn. Voyager confirmed their prediction that small nearby "sheepdog" satellites were necessary to confine and control narrow rings by discovering three sheepdog satellites controlling the outer edge of the A-ring and the inner and outer edge of the F-ring.

Lubow and Tremaine investigated the validity of the random phase approximation used in calculating gravitational shocks in globular clusters. According to this approximation, the phases of cluster stars in successive passages through the disk are uncorrelated. They use a simple model potential so that the orbits can be integrated analytically between shocks; as a result the computations can be done very quickly.

Piran continued work on numerical relativity. He studied coordinate conditions (with J. Bardeen) and showed that only two coordinate conditions (isothermal and radial) can be used for numerical calculations employing spherical (r, θ, ϕ) coordinates.

Motivated by the long-standing search for a cosmologically significant density of intergalactic gas, Paul R. Shapiro and Bahcall calculated in detail the cosmological absorption spectrum which metal ions in an intergalactic medium (IGM) can contribute to quasar x-ray spectra. They found that a hot IGM with a small admixture of metal ions has an optical depth greater than unity for an important range of temperatures, quasar redshifts and soft x-ray wavelengths. This conclusion remains true even if the density of the intergalactic medium is below the closure density and contains less than the solar abundance of metals.

Shapiro and Bahcall also collaborated on a study of x-ray absorption and post-Auger decay. They showed that K-shell and x-ray absorption by multi-electron atoms, which usually results in a further Auger ionization, frequently yields product ions which are in excited states and which must decay by spontaneous emission. The astrophysical importance of this process for the UV emission spectra of quasars, Seyfert galaxies and Galactic x-ray sources like Sco X-1 and the Crab Nebula was analyzed in detail.

Mordehai Milgrom and Shapiro collaborated on a calculation of the acceleration of a steady-state, spherically symmetric, supersonic, relativistic outflow by a strong continuum radiation flux. Their work represents the first detailed investigation of the idea of "line-locking," a process that has often been suggested as being operative in astrophysical plasmas. In the model considered, the accelerated gas attains a terminal velocity which is consistent with observations of SS433.

John J. Giuliani, Jr. developed a computer program for investigating the role of thermal conduction in fast shock waves associated with stellar winds. Initial calculations revealed that the post-shock cooling region can be significantly reduced in size, thereby suggesting that standard hot interstellar bubbles around mass losing stars must be revised. In collaboration with Bruce T. Draine and Lubow, the process of thermal evaporation of gas from globular clusters was shown to be as important as ram pressure stripping. Giuliani also developed a technique for studying the expansion of axisymmetric thin shells in the snowplow approximation; he applied this technique to the distortion of swept-up shells around mass losing stars.

Draine computed the infrared emission expected from dust in interstellar gas which is shocked. He found that the resulting emission should be detectable with present-day instrumentation and can provide a useful diagnostic for supernova remnants within dense clouds. Draine has also continued to study the structure of magnetohydrodynamic shock waves in interstellar gas, concentrating for the present on such shock waves in very dense molecular clouds (in collaboration with W. Roberge and A. Dalgarno, Harvard University). A model was found which can account for all of the hitherto-unexplained H_2 and CO emission lines emitted by the high velocity gas in the Orion molecular cloud.

Lubow and Cowie (Massachusetts Institute of Technology) constructed a dynamical model for gas in spiral galaxies based on Cowie's cloud-cloud collision model in a hot intercloud medium. The clouds are considered to form a warm, viscous fluid which is forced by the spiral field of the galaxy. In contrast to the results for a warm intercloud medium, these results indicate significant damping of the gas response and a phase-shifted density maximum *behind* the minimum of the spiral potential for the Galaxy.

Tonry extended the relation between luminosity and velocity dispersion to much smaller velocity dispersions. Work was started with Bahcall on a project to determine the sensitivity of faint galaxy counts and colors to parameters of non-evolved, local galaxies and to both present-day and possible space-telescope detection and analysis schemes.

Milgrom used data on the moving line widths in SS433 to determine intrinsic properties of the relativistic plasma beams (with B. Margon and S. Anderson, University of Washington) in this extraordinary object.

Charles R. Alcock (in collaboration with K. Gorski, Warsaw) showed that the global properties of gravitational lenses are sensitive to a cosmological constant. A positive cosmological constant greatly facilitates the multiple imaging of quasars by clusters of galaxies. It will be possible to estimate the cosmological constant using these results if a significant number of lenses are discovered.

Alcock also clarified the outer boundary conditions for the mean electric field inside a star.

The School of Natural Sciences

Permanent Member, Members with Long-term Appointments, Members and Visitors, 1980-81

In the section which follows, the information was obtained from material provided by the members and visitors.

Permanent Member

Julian H. Bigelow. *Applied mathematics; electronic computers; experimental physics.*
Born 1913, Nutley, New Jersey. Massachusetts Institute of Technology, BS 1934, MS 1935.
Sperry Rand Corporation, research engineer 1936-39; IBM Corporation, research engineer 1939-41; Massachusetts Institute of Technology, research associate 1941-42, instructor 1942-43; Columbia University, OSRD, statistical research group, associate director 1943-46; Institute for Advanced Study, Electronic Computer Project, head of experimental group 1946-51, School of Mathematics, permanent member 1951-70, School of Natural Sciences, permanent member 1970- ; University of California at Los Angeles, visiting professor 1966-67; Massachusetts Institute of Technology, neurosciences research program, visiting scientist 1969-70.

Members with Long-term Appointments

Charles R. Alcock. *Astrophysics.*
Born 1951, Windsor, England. University of Auckland, BS 1973; California Institute of Technology, PhD 1978.
California Institute of Technology, graduate research fellow 1973-78; Institute for Advanced Study, member with long-term appointment 1977- .

Bruce T. Draine. *Astrophysics.*
Born 1947, Calcutta, India. Swarthmore College, AB 1969; Cornell University, MA 1975, PhD 1978.
Harvard University, Center for Astrophysics, research fellow 1977-79; Institute for Advanced Study, member 1979-80.

Herman H. Goldstine. *See page 27 for biographical entry.*

Otto E. Neugebauer. *See page 27 for biographical entry.*

Scott D. Tremaine. *Astrophysics.*
Born 1950, Toronto, Canada. McMaster University, BS 1971; Princeton University, MA 1973, PhD 1975.
California Institute of Technology, research fellow 1975-77; Institute for Advanced Study, member with long-term appointment 1977- .

Members

Varouzhan Baluni. *Particle physics; field theories.*
Born 1943, Cairo, Egypt. Moscow University, MA 1965; Joint Institute for Nuclear Research, Dubna, USSR, PhD 1969.
Yereran and Moscow Universities 1969-72; Massachusetts Institute of Technology 1974- ; Institute for Advanced Study, 1979- .

Korkut Bardakci. *Particle physics.*
Born 1936, Turkey. Robert College, BS 1957; University of Rochester, PhD 1962.
University of Minnesota, research associate 1962-63; Institute for Advanced Study, member 1963-64, 1964-66; Lawrence Radiation Laboratory, visitor 1964; University of California at Berkeley, assistant professor 1966-68, associate professor 1968-71, professor 1971- .

Michael Dine. *Elementary particle theory.*
Born 1953, Cincinnati, Ohio. Johns Hopkins University, BS 1974; Yale University, PhD 1978.
Stanford Linear Accelerator Center, research associate 1978- .

Robert S. Doran. *Mathematical physics.*
Born 1937, Winthrop, Iowa. University of Iowa, BS 1962, MA 1964; University of Washington, PhD 1968.

Texas Christian University, assistant professor 1969-71, associate professor 1972-79, professor 1979- ; University of Texas at Austin, visiting associate professor 1979.

John L. Giuliani, Jr. *Astrophysics, interstellar matter, hydrodynamics.*

Born 1950, Baltimore, Maryland. Georgetown University, AB 1972, MA 1974; Yale University, MS 1977, PhD 1979.

Institute for Advanced Study, member 1979- .

Frederic L. Green. *Elementary particle theory.*

Born 1951, New York, New York. Rensselaer Polytechnic Institute, BS 1973; Yale University, PhD 1979.

Institute for Advanced Study, member 1979- .

Brosl Hasslacher. *Theoretical high energy physics.*

Born 1941, New York, New York. Harvard College, AB 1962; State University of New York at Stony Brook, PhD 1971.

University of Illinois, postdoctoral fellow 1971-73; Institute for Advanced Study, member 1973-75, 1979- ; California Institute of Technology, senior research fellow 1975-78; Ecole Normale Supérieure, research associate of CNRS at ENS 1978-79.

John R. Hiller. *Particle physics.*

Born 1953, Scranton, Pennsylvania. Drexel University, BS 1976; University of Maryland, MS 1978, PhD 1980.

Keiji Kikkawa. *Particle physics.*

Born 1935, Shimane-Ken, Japan. Tokyo Metropolitan University, BS 1959; University of Tokyo, MS 1961, PhD 1964.

University of Tokyo, research associate 1964-66, 1969-70; University of Rochester and University of Wisconsin, research associate 1966-69; City College of New York, associate professor 1970-74; Osaka University, associate professor 1974-79; Hiroshima University, professor 1979- .

Alan S. Lapedes. *Quantum effects in general relativity.*

Born 1951, USA. University of Virginia, AB 1973; University of Cambridge, PhD 1978.

University of Cambridge, DAMTP, NATO postdoctoral fellow 1978-79; Institute for Advanced Study, member 1979- .

David G. Laughton. *Field theory.*

Born 1953, Ottawa, Canada. University of Toronto, BS 1974; Princeton University, PhD 1980.

Joel L. Lebowitz. *Equilibrium and nonequilibrium statistical mechanics.*

Born 1930, Taceva, Czechoslovakia. Brooklyn College, BS 1952; Syracuse University, MS 1955, PhD 1956.

Yale University, NSF postdoctoral fellow 1956-57; Stevens Institute of Technology, assistant professor 1957-59; Yeshiva University, Belfer Graduate School of Science, assistant professor 1959-60, associate professor 1960-65, professor 1965-67, chairman, department of physics 1968-76; Institut des Hautes Etudes, Guggenheim fellow 1976-77; Rutgers University, Center for Mathematical Science, director and professor of math/physics 1977- .

Stephen H. Lubow. *Astrophysics.*

Born 1949, Salem, Massachusetts. Cornell University, BS 1971; University of California at Berkeley, MS 1972, PhD 1977.

University of California at Los Angeles, postdoctoral scholar 1976-79; Institute for Advanced Study, member 1979- .

Mordehai Milgrom. *Astrophysics.*

Born 1946, Iasi, Rumania. Hebrew University, BS 1966; Weizmann Institute, MS 1968, PhD 1973.

University of Illinois, research assistant professor 1976-77; Weizmann Institute, assistant professor 1976-79, associate professor 1979- .

Emil Mottola. *Particle physics.*

Born 1953, Bronx, New York. Columbia University, BA 1974, MA 1976, PhD 1979.

Columbia University, Pfister Fellow 1976-79; Institute for Advanced Study, member 1979- .

Chiara R. Nappi. *Constructive field theory and particle physics.*

Born 1948, Naples, Italy. Naples, laurea in fisica 1972, diploma Scuola di Perfezionamento 1976.

University of Naples, contrattista 1972-76; University of Oslo, Vitenskapelig assistant 1974; Harvard University, NATO fellow 1976-77, research fellow 1977-78, lecturer in physics 1978-79, Bunting fellow 1979-80.

Izumi Ojima. *Quantum theory of gauge fields.*
Born 1949, Japan. Kyoto University, Faculty of Medicine, BMed 1975, Faculty of Science, MSc 1977, PhD 1980.

Burt A. Ovrut. *Theoretical particle physics.*
Born 1946, New York, New York. McGill University, BS 1967; University of North Carolina, MSc 1973; University of Chicago, PhD 1978.
Brandeis University, research associate 1978- .

Abraham Pais. *Particle physics and scientific biography of Albert Einstein.*
Born 1918, Amsterdam, Holland. University of Amsterdam, BS 1938; University of Utrecht, MS 1940, PhD 1941.
Institute for Advanced Study, School of Mathematics, professor 1951-63; Rockefeller University, professor 1963- .

Tsvi Piran. *General relativity and relativistic astrophysics.*
Born 1949, Tel Aviv, Israel. Tel Aviv University, BS 1970, MS 1972; Hebrew University, PhD 1976.
University of Oxford, postdoctoral research assistant 1976-77; University of Texas at Austin, research associate 1977- .

Gert Roepstorff. *Quantum statistical mechanics.*
Born 1937, Hamburg, Germany. University of Hamburg, Diploma 1962, Dr. 1964.
Massachusetts Institute of Technology, research fellow 1964-65; Argonne National Laboratory, research associate 1965-66; University of Hamburg, assistant 1966-72, professor 1972-74; Technische Hochschule Aachen, professor 1974- .

Randy R. Ross. *Astrophysics: cosmic X-ray sources and related problems.*
Born 1945, Seattle, Washington. George Washington University, BS 1967; University of Wisconsin, MS 1968; University of Colorado, PhD 1978.
Jamestown (New York) Community College, instructor 1968-70, assistant professor 1970-73; University of Colorado, graduate fellow 1974-76, 1977-78, Boettcher Foundation fellow 1976-77; Institute for Advanced Study, member 1978-79; University of Cambridge, Institute of Astronomy, NATO postdoctoral fellow 1979-80.

Stuart A. Samuel. *Particle physics.*
Born 1953, Buffalo, New York. Princeton University, BA 1975; University of California at Berkeley, PhD 1979.
Lawrence Berkeley Laboratory, research assistant 1977- ; Institute for Advanced Study, member 1979- .

Paul R. Shapiro. *Astrophysics.*
Born 1953, New Haven, Connecticut. Harvard College, AB 1974; Harvard University, PhD 1978.
Institute for Advanced Study, member 1978- .

Raymond M. Soneira. *Astrophysics.*
Born 1949, New York, New York. Columbia College, BS 1972; Princeton University, MS 1974, PhD 1978.
Institute for Advanced Study, member 1978- .

Rafael D. Sorkin. *General relativity.*
Born 1945, Orlando, Florida. Harvard College, AB 1966; California Institute of Technology, PhD 1974.
University College, Cardiff, Wales, postdoctoral research assistant 1974-77, Science Research Council fellow 1977-78; University of Chicago, research associate 1978- .

J. Bryan Taylor. *Plasma physics.*
Born 1928, Birmingham, England. University of Birmingham, AB 1950, PhD 1955.
UK Atomic Energy Authority, Culham Laboratory, head of theory division 1962- ; Institute for Advanced Study, member, second term 1968-69, first term 1973-74.

Colin J. Thompson. *Equilibrium statistical mechanics.*
Born 1941, Sydney, Australia. University of New South Wales, BSc 1962, PhD 1964.
UCSD, Rockefeller University and University of New South Wales, research associate and Queen Elizabeth II fellow 1964-68; Massachusetts Institute of Technology, assistant professor 1968-69; Northwestern University, associate professor 1969-72; Institute for Advanced Study, member 1970-71; University of Melbourne, professor 1972- .

John L. Tonry. *Extragalactic astrophysics.*
Born 1953, Boston, Massachusetts. Princeton

University, BA 1975; Harvard University, MA 1976, PhD 1980.

Julius Wess. *Particle physics.*
Born 1934, Oberwölz, Austria. University of Vienna, PhD 1957.
University of Karlsruhe, professor 1968- .

Wolfhart Zimmerman. *Particle physics.*
Born 1928, Freiburg, Germany. University of Freiburg, PhD 1950.
New York University, professor 1962-74; Max-Planck-Institut für Physik und Astrophysik, scientific member and director 1974- .

Visitors

Kenneth M. Case. *Mathematical physics.*
Born 1923, New York, New York. Harvard University, BA 1945, MA 1946, PhD 1948.
Los Alamos Scientific Laboratory, physics staff 1944-45, consultant 1948- ; University of Michigan, assistant professor of physics 1950-52, professor of chemistry 1953-67; Rockefeller University, professor of physics 1967- ; Institute for Advanced Study, member 1948-49, 1949-50, 1956-57, visitor 1969-70, 1975-76, 1976-77, 1978-79, 1979-80.

Willy Fischler. *Field theory; high energy physics.*
Born 1949, Antwerp, Belgium. Université Libre de Bruxelles, BS 1970, MS 1972, PhD 1976.
CERN, postdoctoral fellow 1975-77; Los Alamos Scientific Laboratory, postdoctoral fellow 1977-79.

Bohdan Paczyński. *Astrophysics.*
Born 1940, Wilno, Poland. University of Warsaw, MA 1962, PhD 1964.
University of Colorado, JILA, visiting fellow 1968-69; California Institute of Technology, visiting professor 1973, Sherman Fairchild distinguished scholar 1975-76; Copernicus Astronomical Center, Poland, associate professor 1974- ; Institute for Advanced Study, visitor, fall 1974, spring 1976, spring 1977, spring 1978, spring 1980; University of California at Berkeley, visiting professor 1979.

Herbert J. Rood. *Astrophysics.*
Born 1937, New Brunswick, New Jersey. Massachusetts Institute of Technology, BS 1959; University of Michigan, MS 1961, PhD 1965.
Mount Wilson and Palomar Observatories, research fellow 1965; Wesleyan University, assistant professor; Institute for Advanced Study, member 1972-73, visitor 1979-80.

The School of Social Science

Faculty

Clifford Geertz
Albert O. Hirschman
(1907 Foundation Professor)
Michael Walzer

Member with Long-term Appointment

Bernard Lewis

The School of Social Science

In terms of its formal existence, the School of Social Science is the youngest of the Institute's four divisions. Although its roots go back to 1935 to what was then the School of Economics and Politics at the Institute, its creation as an enduring program came with a permanent academic appointment in 1970-71 and its formulation as a School in 1973. This process of moving from program to School, from experimental venture to institutionalization, is an essential characteristic of growth at the Institute.

The School of Social Science pursues an operational pattern parallel to that of other Institute Schools, combining a rather small number of permanent Faculty with a larger group of visiting annual members. These are drawn from an ever wider pool of possibilities created by individuals who initiate their own applications as well as by those who respond to invitations issued by the School.

The School of Social Science does not normally attempt to take on large-scale statistical or quantitative studies. Such work has been done at the Institute but it is not central to its purposes. Furthermore, the School does not select certain social problems and, seeking their solutions, come up with prescriptions for this or that social malaise. This does not mean that such uses may not be made of work accomplished at the Institute. Indeed, an interest in policy questions has characterized the work of some members of the School and will surely occur again in the future. However, the main focus of the School is interpretive in nature, investigating the meanings of social behavior and delineating the determinants of social change. As such it is resolutely multi-disciplinary, cross-cultural and internationally comparative, drawing its data from historical as well as contemporary problems, exploiting ethnographic as well as quantitative sources.

In a sense, the empirical findings of the social sciences are employed to criticize and to refine both methodology and theory in the contemporary human sciences. Thus the School, while giving credit to the long-dominant quantitative approach in American social science, nevertheless shares in the growing numbers of reservations expressed about it; that is, that its methods are narrow and overspecialized, that its procedures lead to a warping present-mindedness and that both combine to create an unjustified scientism, incapable of producing a legitimate, durable set of solutions to the pressing social and economic problems of our time.

This intellectual posture demonstrates one of the roles of the Institute for Advanced Study as part of the seamless fabric of higher education and research—to use, when warranted, its private security and intellectual freedom for an independent position in, and critical assessment of, the academic accomplishment embraced by its areas of expertise.

Academic Activities, 1980-81

As is now traditional, the principal intellectual communication not only among the members of the School but also between them and a group of members of the School of Historical Studies took place during the weekly luncheon seminars on Thursdays. These seminars covered a wide spectrum of topics as can be seen in the Record of Events. Seven out of the twenty-eight seminars (through May 14) were given by members of the School of Historical Studies, one by the Director's Visitor and two by guest scholars (Jon Elster of Norway and Wolf Lepenies of Germany). The seminars were remarkably well-attended, each topic attracting of course a somewhat different audience; discussions were lively and spilled over into subsequent informal conversations and exchanges.

The focus of the year was the comparative impact of colonial regimes on the newly independent countries in Asia, Africa and Latin America. Eight members were interested in this area and formed a seminar that met regularly at two-week intervals on Monday afternoons. In addition to these members, a number of outside scholars both from the School of Historical Studies and Princeton University gave talks that broadened the range of the seminar to such topics as the impact of Japan and ancient Rome as colonial powers. The topics the seminar discussed are shown in the Record of Events. The comparative emphasis of the seminar was much appreciated by the participants. Particularly intensive exchanges took place, for example, between two Indian scholars (an economist and an economic historian) with a political scientist-historian from Brazil and a political scientist specializing in Latin America from the United States, and continuing discussions among them in the coming years are quite likely to ensue.

Three members of the group—Amal Rassam, Theda Skocpol and Robert Darnton—were appointed to be members of the project "Self-Perception, Mutual Perception and Historical Development" that was organized jointly by the School of Historical Studies and the School of Social Science under a three-year grant from the Andrew W. Mellon Foundation. An evening seminar was organized for this group, which met regularly to discuss various aspects of the topic that had been selected for the program's second year, which was "Self-Perception in Relation to Revolution and Reform." A report on the proceedings of the seminar is available from Professor Elliott.

One other informal seminar was organized during the spring term. A small anthropological study group was convened and met six times to discuss in greater detail some of the work in progress.

The School of Social Science

Member with Long-term Appointment, Members and Visitor, 1980-81

In the section which follows, the information was obtained from material provided by the members and visitor.

Member with Long-term Appointment

Bernard Lewis. *See page 27 for biographical entry.*

Members

Akbar Salahudin Ahmed. *Lineage structure, agnatic rivalry and administration in a tribal society.*

Born 1943, Allahabad, India. University of Birmingham, Bach. Soc. Sci. 1964; University of Cambridge, Diploma in education 1965; University of London, PhD 1978.

Assistant commissioner, Punjab, NWFP and East Pakistan 1966-71; deputy secretary, home department, NWFP 1971-73; registrar, cooperative societies, NWFP 1973-74; Pakistan Academy Rural Development (Peshawar), instructor of sociology and anthropology; political agent, Orakzai Agency, NWFP 1976-77; London, Ford Foundation fellow, SOAS 1977-78; additional secretary, home department, NWFP 1978; political agent, South Waziristan Agency, NWFP 1978-80.

David Bjelajac. *American history painting; American presidency symbolism.*

Born 1950, Watertown, Wisconsin. University of Wisconsin at Madison, BA 1972, MA 1973.

Institute for Advanced Study, Assistant to Professor Clifford Geertz.

Irwin L. Collier. *Comparative economic systems and econometrics.*

Born 1952, USA. Yale University, BA 1974.

Institute for Advanced Study, Assistant to Professor Albert O. Hirschman.

Robert Darnton. *See page 31 for biographical entry.*

Mrinal K. Datta-Chaudhuri. *Role of state and economic organization in economic development, particularly issues relating to decentralization.*

Born 1934, Srigauri, India. Presidency College (Calcutta), BSc 1953; University of Calcutta, MA 1960; Massachusetts Institute of Technology, PhD 1966.

Indian Statistical Institute, associate professor 1966-67, professor 1967-68; University of Delhi, School of Economics, professor 1968- ; University of Oxford, Nuffield College, visiting fellow, spring 1971; University of Minnesota, visiting professor 1973-74.

José Murilo de Carvalho. *Adaptation of imported ideas in nineteenth-century Brazil.*

Born 1939, Minas Gerais, Brazil. Federal University (Brazil), AB 1965; Stanford University, MA 1969, PhD 1975.

Federal University, associate professor 1969-77; Instituto Universitario de Pesquisas do Rio de Janeiro, associate professor 1979- .

John J. Gumperz. *Anthropological linguistics.*

Born 1922, Germany. University of Cincinnati, BA 1947; University of Michigan, MA 1949, PhD 1954.

Cornell University, instructor 1952-54; India, Ford Foundation postdoctoral fellow 1954-56; University of California at Berkeley, instructor, assistant professor, associate professor, professor, 1956- .

Jacques Julliard. *Social, political and cultural history of contemporary France.*

Born 1933, France. Agrégation of history.

Centre National de la Recherche Scientifique, attaché de recherches 1962-65; Sorbonne, assistant 1965-68; Université de Paris VIII, maître assistant 1968-78; Ecole des Hautes Etudes en Sciences Sociales, directeur d'études 1978- .

Robert R. Kaufman. *The origins and dynamics of bureaucratic-authoritarian regimes in Latin America.*

Born 1939, Kansas City, Missouri. Harvard University, AB 1961, PhD 1967.

Harvard University, Center for International Affairs, research associate 1967-68, 1975-76; Rutgers University, associate professor 1972-76, Douglass College, assistant professor 1968-72, professor and chairman, department of political science 1976- .

Ted Koontz. *Political science.*

Born 1946, Beatrice, Nebraska. Bethel College (Kansas), BA 1969; Harvard University Divinity School, MDiv 1972; Harvard University, MA 1980.

Institute for Advanced Study, Assistant to Professor Michael Walzer.

Dharma Kumar. *British imperialism in India in comparative perspective.*

Born 1928, Bangalore, India. University of Bombay, AB 1946; University of Cambridge, MA 1948, PhD 1961.

Research officer and deputy director, Reserve Bank of India, Bombay 1949-57; officer on special duty, office of the chief economic adviser, ministry of finance, government of India, Delhi 1957-63; director of research, Indian Council of World Affairs, Delhi 1963-65; Delhi School of Economics, visiting fellow 1965-66, reader 1967-72, professor of economic history 1974- ; Clare Hall, University of Cambridge, fellow 1966-67; World Bank, economist 1972-73; Institute of Development Studies, Sussex, fellow 1973-74.

Amal Rassam. *Anthropology and social history in the Middle East and North Africa.*

Born 1938, Iraq. American University of Beirut, BA 1956; University of Chicago, MA 1959; University of Michigan, PhD 1970.

University of Alberta, lecturer 1959-61; Yale University, research assistant 1962-65; Southern Connecticut State College, instructor 1965-66; University of Michigan, teaching fellow 1967-68, Center for Near Eastern and North African Studies, assistant to the director 1970-72; Queens College, City University of New York, assistant professor 1972-75, associate professor 1975- , chairperson, department of anthropology 1979- .

Allan Sharlin. *Historical sociology and historical demography.*

Born 1950, Trenton, New Jersey. University of Chicago, AB 1970; University of Wisconsin, MA 1972, PhD 1976.

University of Wisconsin at Madison, lecturer 1976; Office of Population Research, Princeton University, visiting fellow 1976-78; University of California at Berkeley, assistant professor 1978- .

Theda R. Skocpol. *United States politics and the limits of recovery and reform in the New Deal.*

Born 1947, Detroit, Michigan. Michigan State University, BA 1969; Harvard University, MA 1972, PhD 1975.

Harvard University, instructor, fall 1974, assistant professor 1975-78, administrator of graduate program in sociology 1977-80, associate professor 1978- .

Andreas Teuber. *Identity of the citizen required by democratic society.*

Born 1942, Cambridge, Massachusetts. Harvard College, AB 1964, PhD 1975; St. John's College, University of Oxford, MA 1966.

Massachusetts Institute of Technology, instructor 1969-72; Harvard University, lecturer, member of committee on degrees in social studies 1973-75; University of Washington, assistant professor 1975- ; University of Massachusetts, visiting professor 1976-77.

Jean-Claude Vatin. *The impact of France on Maghreb institutions.*

Born 1934, Neuilly-sur-Seine, France. France, baccalauréat; University of Oxford, B.Litt. (Oxon.); doctorate in political science.

Institute of Political Science, Algiers, faculty of law, lecturer in politics and public law 1963-68; University of Algiers, department of public law and political science, associate professor 1968-72; Centre de Recherches et d'Etudes sur les Sociétes Méditerranéenes, attaché de recherche 1972-76, chargé de recherches 1976- .

Annette B. Weiner. *Comparative model of reproduction in Melanesian societies.*

Born 1933, Philadelphia, Pennsylvania. University of Pennsylvania, AB 1968; Bryn Mawr College, PhD 1974.

Franklin and Marshall College, visiting assistant professor 1973-74; University of Texas at Austin, assistant professor 1974- .

Henk L. Wesseling. *Dutch imperialism in a comparative perspective.*

Born 1937, The Hague, Holland. University of Leiden, AB 1958, MA 1961, PhD 1969.

University of Leiden 1966-71, professor 1972- ; Ecole des Hautes Etudes en Sciences Sociales 1971-72.

M. Crawford Young. *Colonial experience and post-colonial politics in Africa.*

Born 1931, Philadelphia, Pennsylvania. University of Michigan, AB 1953; Harvard University, PhD 1964.

University of Wisconsin at Madison, assistant professor 1963-66, associate professor 1966-69, professor 1969- , chairman, African studies program 1964-68, associate dean, graduate school 1968-71, chairman, department of political science 1969-72; Makerere University (Kampala, Uganda), visiting professor 1965-66; Université Nationale du Zaire, Faculté des Sciences Sociales, dean 1973-75.

Visitor

Eytan Sheshinski. *Economics.*

Born 1937, Israel. Hebrew University, BA 1961, MA 1963; Massachusetts Institute of Technology, PhD 1966.

Economic consultant to the Knesset, Israel 1972-74; consultant on welfare policy to the office of the prime minister, Israel 1975; visiting professor, department of economics, Stanford University 1976; chairman, department of economics, Hebrew University 1979- ; editor, *Econometrica, Journal of Public Economics, North-Holland Series in Public Economics;* Oskar Morgenstern Fellow, Mathematica, Inc. 1980.

Record of Events, 1980-81

September 29
School of Natural Sciences

Theoretical Physics Seminar: "Screening of Instantons in Quark Matter"
Varouzhan Baluni, Massachusetts Institute of Technology; Visiting Member, School of Natural Sciences, IAS

October 1
School of Mathematics

Complex Geometry Seminar: "Introduction to Complex Surface Theory"
Richard Klotz, Stanford University; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

October 2
School of Historical Studies

Art History Colloquium: "Image and Interdiction in the Netherlands in the Sixteenth and Seventeenth Centuries"
David Freedberg, University of London; Visiting Member, School of Historical Studies, IAS

School of Mathematics

Topology Seminar: "Classifying Spaces for Hermitian K-Theory"
Ronnie Lee, Yale University; Visiting Member, School of Mathematics, IAS

Several Complex Variables Seminar: "Envelopes of Holomorphy of Compact Sets"
William R. Zame, State University of New York at Buffalo; Visiting Member, School of Mathematics, IAS

October 3
School of Mathematics

Differential Geometry Seminar: "Harmonic Maps for 2-Dimensional Manifolds"
Jürgen Jost, University of Bonn; Visitor, School of Mathematics, IAS

October 7
School of Mathematics

Harish-Chandra Seminar: "The Weak Inequality and Automorphic Forms"
Harish-Chandra, Professor, School of Mathematics, IAS

Cohomology of Arithmetic Groups and Automorphic Forms: "Introduction"
Armand Borel, Professor, School of Mathematics, IAS

Lecture Series: "Euclidean Lie Algebras and Combinatorial Identities, I"
Robert L. Wilson, Rutgers University; Visiting Member, School of Mathematics, IAS

October 8
School of Mathematics

Complex Geometry Seminar: "Classification of Complex Surfaces, I (after Kodaira)"
Richard Klotz, Stanford University; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

October 9
School of Mathematics

Topology Seminar: "On the Classification of Finite Group Actions of $\mathbb{R}^3$"
William H. Meeks III, Instituto de Matemática Pura e Aplicada, Rio de Janeiro, Brazil; Visiting Member, School of Mathematics, IAS

Several Complex Variables Seminar: "Insolvability of the $\bar{\partial}$-Problem with Bounds"
William R. Zame, State University of New York at Buffalo; Visiting Member, School of Mathematics, IAS

School of Social Science

Seminar: "The Rise and Decline of Development Economics"
Albert O. Hirschman, Professor, School of Social Science, IAS

October 10
School of Mathematics

Differential Geometry Seminar: "Extremal Spacelike Hypersurfaces in Minkowski Space-Time"
Robert Bartnik, University of Melbourne; Assistant to Professor Shing-Tung Yau, School of Mathematics

October 13
School of Mathematics

Members Seminar: "A Survey of the $\bar{\partial}$-Neumann Problem"
Joseph J. Kohn, Princeton University; Visiting Member, School of Mathematics, IAS

School of Natural Sciences

Theoretical Physics Seminar: "Chiral Models: Their Implication for Gauge Theories"
Frederic L. Green, Yale University; Visiting Member, School of Natural Sciences, IAS

October 14
School of Mathematics

Harish-Chandra Seminar: "The Weak Inequality and Automorphic Forms" (continued)
Harish-Chandra, Professor, School of Mathematics, IAS

Cohomology of Arithmetic Groups and Automorphic Forms Seminar: "Construction of Dual Forms for SO(n,1)"
Stephen S. Kudla, University of Maryland; Visiting Member, School of Mathematics, IAS

Lecture Series: "Euclidean Lie Algebras and Combinatorial Identities" (continued)
James I. Lepowsky, Rutgers University; Visiting Member, School of Mathematics, IAS

October 15
School of Mathematics

Complex Geometry Seminar: "Classification of Complex Surfaces, I (after Kodaira)" (continued)
Richard Klotz, Stanford University; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

October 16
School of Mathematics

Topology Seminar: "Homotopy Invariants of Foliations"
Steven E. Hurder, University of Illinois; Visiting Member, School of Mathematics, IAS

Several Complex Variables Seminar: "Dolbeault Cohomology, Envelopes of Holomorphy, etc."
Michael G. Eastwood, University of Oxford; Visiting Member, School of Mathematics, IAS

School of Social Science

Seminar: "The Great Cat Massacre of the rue Saint-Séverin (1732)"
Robert Darnton, Princeton University; Visiting Member, School of Social Science, and Visitor, School of Historical Studies, IAS

October 17
School of Mathematics

Complex Geometry Seminar: "Resolution of Singularities of Two-Dimensional Analytic Spaces"
James Mackraz, University of California at San Diego; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

Differential Geometry Seminar: "The Equivariant Sphere Theorem, Loop Theorem and Dehn's Lemma"

William H. Meeks III, Instituto de Matemática Pura e Aplicada, Rio de Janeiro, Brazil; Visiting Member, School of Mathematics, IAS

School of Natural Sciences

Theoretical Physics Seminar: "The Thermodynamics of the Nonlinear Model: A Toy for High Temperature QCD"
Willy Fischler, University of Pennsylvania; Visitor, School of Natural Sciences, IAS

October 20
School of Mathematics

Members Seminar: "On Local and Global Metaplectic Conjectures"
Gopal Prasad, Tata Institute, Bombay, India; Visiting Member, School of Mathematics, IAS

School of Social Science

Comparative Colonialism Seminar: "Formation of the Colonial State in Zaire"
M. Crawford Young, University of Wisconsin at Madison; Visiting Member, School of Social Science, IAS

October 21
School of Mathematics

Harish-Chandra Seminar: "The Weak Inequality and Automorphic Forms" (continued)
Harish-Chandra, Professor, School of Mathematics, IAS

Cohomology of Arithmetic Groups and Automorphic Forms Seminar: "Construction of Dual Forms for SO(n,1)" (continued)
Stephen S. Kudla, University of Maryland; Visiting Member, School of Mathematics, IAS

October 22
School of Mathematics

Lecture Series: "Euclidean Lie Algebras and Combinatorial Identities" (continued)
James I. Lepowsky, Rutgers University; Visiting Member, School of Mathematics, IAS

Complex Geometry Seminar: "Classification of Complex Surfaces (after Kodaira)" (continued)
Richard Klotz, Stanford University; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

October 23
School of Mathematics

Topology Seminar: "Topology of Real Algebraic Varieties"
Selman Akbulut, Rutgers University; Visiting Member, School of Mathematics, IAS

Several Complex Variables Seminar: "Stability of Polynomial Hulls"
Eric D. Bedford, Princeton University; Visiting Members, School of Mathematics, IAS

School of Social Science

Seminar: "Colonial Wars and Armed Peace, 1870-1914: A Reconnaissance"
Henk Wesseling, University of Leiden; Visiting Member, School of Social Science, IAS

October 24
School of Mathematics

Complex Geometry Seminar: "Resolution of Singularities of Two-Dimensional Analytic Spaces" (continued)
James Mackraz, University of California at San Diego; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

Differential Geometry Seminar: "Incompressible Minimal Surfaces"
Michael H. Freedman, University of California at San Diego; Visiting Member, School of Mathematics, IAS

October 27
School of Mathematics

Marston Morse Memorial Lecture: "A Survey of Affine Differential Geometry"
Guest Lecturer: Eugenio Calabi, University of Pennsylvania

School of Natural Sciences

Theoretical Physics Seminar: "Decoupling Theorems and Minimal Subtraction"
Burt Ovrut, Brandeis University; Visiting Member, School of Natural Sciences, IAS

October 28
School of Mathematics

Harish-Chandra Seminar: "The Weak Inequality and Automorphic Forms" (continued)
Harish-Chandra, Professor, School of Mathematics, IAS

Cohomology of Arithmetic Groups and Automorphic Forms Seminar: "Construction of Dual Forms for SO(n,1)" (continued)
Stephen S. Kudla, University of Maryland; Visiting Member, School of Mathematics, IAS

October 29
School of Historical Studies

Colloquium in Classical Studies: "Some Aspects of Greco-Roman Relations during the War with Antiochus"
Peter S. Derow, Wadham College, Oxford, England; Visiting Member, School of Historical Studies, IAS

School of Mathematics

Organizational Meeting: Concerning the possibility of holding two seminars titled "Introduction to Algebraic Geometry" and "Simple Morphisms of Preschemes (or Algebraic Varieties of Commutative Rings)"
Richard E. Sot, University of Rochester; Visiting Member, School of Mathematics, IAS

Lecture Series: "Euclidean Lie Algebras and Combinatorial Identities" (continued)
James I. Lepowsky, Rutgers University; Visiting Member, School of Mathematics, IAS

Complex Geometry Seminar: "Classification of Complex Surfaces (after Kodaira)" (continued)
Richard Klotz, Stanford University; Visiting Member, School of Mathematics, IAS

October 30
School of Mathematics

Topology Seminar: "1-Relator Knot Groups"
Frederick G. H. Norwood, University of Southwestern Louisiana; Visiting Member, School of Mathematics, IAS

Several Complex Variables Seminar: "Polynomial Hulls of 2-Spheres"
Eric D. Bedford, Princeton University; Visiting Member, School of Mathemetics, IAS

School of Social Science

Seminar: "The Transformation of Civic Ritual in Modern England: The Case of the *Colchester Oyster Feast*"
David Cannadine, Christ's College, Cambridge, England; Visiting Member, School of Historical Studies, IAS

October 31
School of Mathematics

Complex Geometry Seminar: "Resolution of Singularities of Two-Dimensional Analytic Spaces" (continued)
James Mackraz, University of California at San Diego; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

Differential Geometry Seminar: "L^2-cohomology of Warped Products and Arithmetic Groups"
Guest Lecturer: Steven Zucker, Rutgers University

School of Natural Sciences

Theoretical Physics Seminar: "Supersymmetric Yang-Mills Theories"
Julius Wess, University of Karlsruhe, West Germany; Visiting Member, School of Natural Sciences, IAS

November 3
School of Mathematics

Special Lecture: "Some Geometric Aspects of Partial Differential Equations"
Luogeng Hua, Academia Sinica, Peking; Visitor, School of Mathematics, IAS

Members Seminar: "Introduction to Construction of p-adic Unit Balls"
Akira Kurihara, Japan Women's University, Tokyo; Visiting Member, School of Mathematics, IAS

November 4
School of Mathematics

Harish-Chandra Seminar: "The Weak Inequality and Automorphic Forms" (continued)
Harish-Chandra, Professor, School of Mathematics, IAS

Brief Introduction to Algebraic Geometry Seminar
Richard E. Sot, University of Rochester; Visiting Member, School of Mathematics, IAS

Cohomology of Arithmetic Groups and Automorphic Forms Seminar: "Construction of Dual Forms for SO(n,1)" (continued)
Stephen S. Kudla, University of Maryland; Visiting Member, School of Mathematics, IAS

School of Social Science

Comparative Colonialism Seminar: "Dutch Imperialism"
Henk L. Wesseling, University of Leiden; Visiting Member, School of Social Science, IAS

November 5
School of Historical Studies

Colloquium in Classical Studies: "Love as Treason in Augustan Poetry"
Hans-Peter Stahl, University of Pittsburgh; Visiting Member, School of Historical Studies, IAS

School of Mathematics

Lecture Series: "Euclidean Lie Algebras and Combinatorial Identities" (continued)
Robert L. Wilson, Rutgers University; Visiting Member, School of Mathematics, IAS

Simple Morphisms of Preschemes (or Simple Homomorphisms of Commutative Rings) Seminar
Richard E. Sot, University of Rochester; Visiting Member, School of Mathematics, IAS

Complex Geometry Seminar: "Classification of Complex Surfaces (after Kodaira)" (continued)
Richard Klotz, Stanford University; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

November 6
School of Mathematics

Special Differential Geometry Seminar: "Local and Global Behavior of Positive Solutions of Elliptic Equations Related to Geometry"
Basilis Gidas, Rockefeller University; Visitor, School of Mathematics, IAS

Topology Seminar: "Connective Bordism"
Guest Lecturer: T. Bahri, Rutgers University

Several Complex Variables Seminar: "The Kobayashi Metric for a Convex Domain"
Guest Lecturer: Steven Krantz, Princeton University

Special Lecture: "Curvature and Betti Numbers"
Guest Lecturer: M. Gromov, State University of New York at Stony Brook

School of Social Science

Seminar: "Interpretation and Truth in Courtroom Testimony: A Case Study"
John J. Gumperz, University of California at Berkeley; Visiting Member, School of Social Science, IAS

November 7
School of Mathematics

Complex Geometry Seminar: "Resolution of Singularities of Two-Dimensional Analytic Spaces" (continued)
James Mackraz, University of California at San Diego; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

Differential Geometry Seminar: "Curvature and Volume"
Guest Lecturer: M. Gromov, State University of New York at Stony Brook

November 10
School of Mathematics

Special Lecture: "Kahler-Einstein-Calabi-Yau Metric and Moduli of K3 Surfaces"
Guest Lecturer: A. Todorov, Columbia University

Members Seminar: "Potential Theory for Pleurisubharmonic Functions"

Eric D. Bedford, Princeton University; Visiting Member, School of Mathematics, IAS

November 11
School of Mathematics

Harish-Chandra Seminar: "The Weak Inequality and Automorphic Forms" (continued)
Harish-Chandra, Professor, School of Mathematics, IAS

Brief Introduction to Algebraic Geometry Seminar
Richard E. Sot, University of Rochester; Visiting Member, School of Mathematics, IAS

Cohomology of Arithmetic Groups and Automorphic Forms Seminar: "Construction of Dual Forms for SO(n,1)" (continued)
Stephen S. Kudla, University of Maryland; Visiting Member, School of Mathematics, IAS

November 12
School of Historical Studies

Colloquium in Classical Studies: "Myth, Tragedy and the Fine Arts"
Eva C. Keuls, University of Minnesota; Visiting Member, School of Historical Studies, IAS

School of Mathematics

Lecture Series: "Euclidean Lie Algebras and Combinatorial Identities" (continued)
Robert L. Wilson, Rutgers University; Visiting Member, School of Mathematics, IAS

Simple Morphisms of Preschemes (or Simple Homorphisms of Commutative Rings) Seminar
Richard E. Sot, University of Rochester; Visiting Member, School of Mathematics, IAS

Complex Geometry Seminar: "Classification of Complex Surfaces (after Kodaira)" (continued)
Richard Klotz, Stanford University; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

November 13
School of Mathematics

Mathematical Physics Seminar: "Introduction to Fourier Integral Operators and Asymptotic Distribution of Eingenvalues"
Robert Bartnik, University of Melbourne, Australia; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

Topology Seminar: "The Atiyah-Singer Invariant Reidemeister Torsion, and Group Actions on Spheres"
Donald E. Smith, University of Chicago; Visiting Member, School of Mathematics, IAS

Several Complex Variables Seminar: "Balls and Polydisks"
Guest Lecturer: J. E. Fornaess, Princeton University

Special Lecture: "Free Buildings"
Guest Lecturer: Jacques Tits, Collège de France

School of Social Science

Seminar: "Women's Wealth and Political Evolution in the Pacific"
Annette B. Weiner, University of Texas at Austin; Visiting Member, School of Social Science, IAS

November 14
School of Mathematics

Complex Geometry Seminar: "Blowing Down Exceptional Curves in Surfaces"
James Mackraz, University of California at San Diego; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

Differential Geometry Seminar: "Isometric Deformation of Locally Symmetric Spaces and the Blaschke Conjecture"
Guest Lecturer: H. Goldschmidt, Columbia University

School of Natural Sciences

Theoretical Physics Seminar: "Attraction to Large Gauge Orbits"
Guest Lecturer: Claude Lovelace, Rutgers University

November 17
School of Mathematics

Hermann Weyl Lecture Series: "Eigenvalues of Differential Operators"
Guest Lecturer: Charles Fefferman, Princeton University

School of Social Science

Comparative Colonialism Seminar: "Balance Sheet of Imperialism"
Guest Lecturer: Charles Issawi, Princeton University

November 18
School of Mathematics

Harish-Chandra Seminar: "The Weak Inequality and Automorphic Forms" (continued)
Harish-Chandra, Professor, School of Mathematics, IAS

Introduction to Algebraic Geometry Seminar: "The Associated Sheaf of a Presheaf; the Equivalence between the Category of Sheaves of Abelian Groups on a Topological Space X and the Category of Etale Spaces of Abelian Groups over X"
Richard E. Sot, University of Rochester; Visiting Member, School of Mathematics, IAS

Cohomology of Arithmetic Groups and Automorphic Forms Seminar: "On Invariant Cohomology of $SL_n(\mathbb{Z})$"
Ronnie Lee, Yale University; Visiting Member, School of Mathematics, IAS

School of Natural Sciences

Theoretical Physics Seminar: "Monte Carlo Study in U(1) and SU(2) Lattice Gauge Models"
Guest Lecturer: Michael Nauenberg, University of California at Santa Cruz

November 19
School of Historical Studies

Colloquium in Classical Studies: "Unpublished Bronze Inscriptions from Olympia"
Peter A. Siewert, University of Saarbrücken, Dudweiler, West Germany; Visiting Member, School of Historical Studies, IAS

School of Mathematics

Special Lecture: "An Improved Estimate for Certain Diophantine Inequalities Involving Primes"
Ming-Chit Liu, University of Hong Kong; Visiting Member, School of Mathematics, IAS

Lecture Series: "Euclidean Lie Algebras and Combinatorial Identities" (continued)
James I. Lepowsky, Rutgers University; Visiting Member, School of Mathematics, IAS

Simple Homomorphisms of Commutative Rings and Algebraic Varieties Seminar: "Definition and Properties of the Kahler 1-Differentials of B over A Where A Is a Commutative Ring and B Is an A-Algebra; Statements of Some Theorems Characterizing Simple Algebras over a Field To Be Proved Later"
Richard E. Sot, University of Rochester; Visiting Member, School of Mathematics, IAS

Complex Geometry Seminar: "Classification of Complex Surfaces (after Kodaira)" (continued)
Richard Klotz, Stanford University; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

November 20 School of Mathematics	Mathematical Physics Seminar: "Construction of Quantum Solitons in Two Space-Time Dimensions" Basilis Gidas, Rockefeller University; Visitor, School of Mathematics, IAS
	Topology Seminar: "Bordism Invariants of Frame Fields" Ulrich Koschorke, University of Siegen, West Germany; Visiting Member, School of Mathematics, IAS
	Hermann Weyl Lecture Series: "Eigenvalues of Differential Operators" (continued) Guest Lecturer: Charles Fefferman, Princeton University
School of Natural Sciences	Theoretical Physics Seminar: "The Structure of the Galactic Globular Cluster System" Guest Lecturer: Simon D. M. White, University of California at Berkeley
School of Social Science	Seminar: "Ideologies and Development Pathways in Africa" M. Crawford Young, University of Wisconsin at Madison; Visiting Member, School of Social Science, IAS
November 21 School of Mathematics	Complex Geometry Seminar: "Blowing Down Exceptional Curves in Surfaces" (continued) James Mackraz, University of California at San Diego; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS
	Differential Geometry Seminar: "Least Area Surfaces, II: And Applications to Group Actions on 3-Manifolds" Michael Freedman, University of California at San Diego; Visiting Member, School of Mathematics, IAS
November 24 School of Mathematics	Hermann Weyl Lecture Series: "Eigenvalues of Differential Operators" (continued) Guest Lecturer: Charles Fefferman, Princeton University
School of Natural Sciences	Theoretical Physics Seminar: "Continuum Strong Coupling Expansion for QED" Guest Lecturer: Fred Cooper, Los Alamos Scientific Laboratory, New Mexico

November 25
School of Mathematics

Harish-Chandra Seminar: "The Weak Inequality and Automorphic Forms" (continued)
Harish-Chandra, Professor, School of Mathematics, IAS

Introduction to Algebraic Geometry Seminar: "The Associated Sheaf of a Presheaf; the Equivalence between the Category of Sheaves of Abelian Groups on a Topological Space X and the Category of Etale Spaces of Abelian Groups over X" (continued)
Richard E. Sot, University of Rochester; Visiting Member, School of Mathematics, IAS

Cohomology of Arithmetic Groups and Automorphic Forms Seminar: "L-functions for Sp_4 and Applications"
Guest Lecturer: I. Piatetski-Shapiro, Tel Aviv and Yale Universities

Special Lecture: "A Direct Approach to the Goldbach Problem"
Luogeng Hua, Academia Sinica, Peking; Visitor, School of Mathematics, IAS

November 26
School of Mathematics

Lecture Series: "Euclidean Lie Algebras and Combinatorial Identities" (continued)
James I. Lepowsky, Rutgers University; Visiting Member, School of Mathematics, IAS

Complex Geometry Seminar: "Classification of Complex Surfaces (after Kodaira)" (continued)
Richard Klotz, Stanford University; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

December 1
School of Mathematics

Special Lecture: "The Topology and Classification of Complete Minimal Surfaces with Small Total Curvature"
William H. Meeks III, Instituto de Matemática Pura e Aplicada, Rio de Janeiro, Brazil; Visiting Member, School of Mathematics, IAS

Members Seminar: "New Fast Algorithms for Matrix Multiplication and Some Related Problems of the Algebraic Complexity Theory"
Viktor Y. Pan, IBM, Yorktown Heights, New York; Visiting Member, School of Mathematics, IAS

December 2
School of Mathematics

Harish-Chandra Seminar: "The Weak Inequality and Automorphic Forms" (continued)
Harish-Chandra, Professor, School of Mathematics, IAS

Introduction to Algebraic Geometry Seminar: "The Associated Sheaf of a Presheaf; the Equivalence between the Category of Sheaves of Abelian Groups on a Topological Space X and the Category of Etale Spaces of Abelian Groups over X" (continued)
Richard E. Sot, University of Rochester; Visiting Member, School of Mathematics, IAS

Cohomology of Arithmetic Groups and Automorphic Forms Seminar: "On Invariant Cohomology of $SL_n(\mathbb{Z})$" (continued)
Ronnie Lee, Yale University; Visiting Member, School of Mathematics, IAS

December 3
School of Historical Studies

Colloquium in Classical Studies: "Ammianus, Religion, and Julian the Apostate"
John F. Matthews, Queen's College, Oxford, England; Visiting Member, School of Historical Studies, IAS

School of Mathematics

Special Lecture: "The Monge-Ampère Equation on Compact Riemannian Manifolds"
Guest Lecturer: P. Delanoe, University of Pennsylvania

Lecture Series: "Euclidean Lie Algebras and Combinatorial Identities" (continued)
Robert L. Wilson, Rutgers University; Visiting Member, School of Mathematics, IAS

Simple Homomorphisms of Commutative Rings and Algebraic Varieties Seminar: "Review of Basic Definition. A Theorem Relating the Concept of a Simple Variety over a Field of Characteristics Zero Given by Polynomials over the Integers to the Corresponding Varieties over a Finite Field with p Elements Where p Ranges Through All Primes"
Richard E. Sot, University of Rochester; Visiting Member, School of Mathematics, IAS

Complex Geometry Seminar: "Classification of Complex Surfaces (after Kodaira)" (continued)
Richard Klotz, Stanford University; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

December 4 School of Historical Studies	Art History Colloquium: "Patterned Stories in Early Medieval Art" Ernst Kitzinger, Harvard University; Visiting Member, School of Historical Studies, IAS
School of Mathematics	Mathematical Physics Seminar: "Construction of Quantum Solitons in Two Space-Time Dimensions" (continued) Basilis Gidas, Rockefeller University; Visitor, School of Mathematics, IAS
	Topology Seminar: "Mayer-Vietoris Sequence in Algebraic K-Theory" Guest Lecturer: Charles Weibel, Rutgers University
	Several Complex Variables Seminar: "On the Extension Problem of Holomorphic Mappings into Algebraic Varieties" Junjiro Noguchi, Osaka University, Japan; Visiting Member, School of Mathematics, IAS
School of Social Science	Seminar: "From Custom to Legal Rule in Medieval Law" Paul R. Hyams, Pembroke College, University of Oxford; Visiting Member, School of Social Science, IAS
December 5 School of Mathematics	Complex Geometry Seminar: "Blowing Down Exceptional Curves in Surfaces" (continued) James Mackraz, University of California at San Diego; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS
	Differential Geometry Seminar: "Finiteness of the Family of Rational Mappings between Algebraic Varieties" Junjiro Noguchi, Osaka University, Japan; Visiting Member, School of Mathematics, IAS
December 8 School of Mathematics	Members Seminar: "Collections of Vector Fields on a Manifold (Control Theory): An Overview" Henry Hermes, University of Colorado; Visiting Member, School of Mathematics, IAS
School of Social Science	Comparative Colonialism Seminar: "Bank Misr and the Political Economy of Industrialization in Egypt, 1920-1941" Guest Lecturer: Eric Davis, Rutgers University

December 9
School of Mathematics

Harish-Chandra Seminar: "The Weak Inequality and Automorphic Forms" (continued)
Harish-Chandra, Professor, School of Mathematics, IAS

Introduction to Algebraic Geometry Seminar: "The Associated Sheaf of a Presheaf; the Equivalence between the Category of Sheaves of Abelian Groups on a Topological Space X and the Category of Etale Spaces of Abelian Groups over X" (continued)
Richard E. Sot, University of Rochester; Visiting Member, School of Mathematics, IAS

Cohomology of Arithmetic Groups and Automorphic Forms Seminar: "On Invariant Cohomology of $SL_n(\mathbb{Z})$" (continued)
Ronnie Lee, Yale University; Visiting Member, School of Mathematics, IAS

December 10
School of Historical Studies

Colloquium in Classical Studies: "Harvard-ASOR Excavations, Carthage, 1974-1979"
P. Corby Finney, University of Missouri at St. Louis; Visiting Member, School of Historical Studies, IAS

School of Mathematics

Lecture Series: "Euclidean Lie Algebras and Combinatorial Identities" (continued)
James I. Lepowsky, Rutgers University; Visiting Member, School of Mathematics, IAS

Simple Homomorphisms of Commutative Rings and Algebraic Varieties Seminar: "Review of Basic Definition. A Theorem Relating the Concept of a Simple Variety over a Field of Characteristics Zero Given by Polynomials over the Integers to the Corresponding Varieties over a Finite Field with p Elements Where p Ranges Through All Primes"
Richard E. Sot, University of Rochester; Visiting Member, School of Mathematics, IAS

Complex Geometry Seminar: "Classification of Complex Surfaces (after Kodaira)" (continued)
Richard Klotz, Stanford University; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

December 11
School of Mathematics

Topology Seminar: "Foliations by Closed Cylinders in $\mathbb{R}^3$"
Carlos F. Palmeira, Pontificia Universidade Catolica, Rio de Janeiro, Brazil; Visiting Member, School of Mathematics, IAS

Several Complex Variables Seminar: "Regularity of the Bergman Projection in a Weakly Pseudo-Convex Domain"
Guest Lecturer: Steven R. Bell, Princeton University

School of Social Science

Seminar: "Distributive Justice: The Problem of Office"
Michael Walzer, Professor, School of Social Science, IAS

December 12
School of Mathematics

Complex Geometry Seminar: "Blowing Down Exceptional Curves in Surfaces" (continued)
James Mackraz, University of California at San Diego; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

Differential Geometry Seminar: "Regular Polyhedra and Triangle Groups, II"
Guest Lecturer: Ravindra S. Kulkarni, Princeton University

School of Natural Sciences

Theoretical Physics Seminar: "Phase Transitions in Yang-Mills Theory for theta near pi"
Guest Lecturer: Subhash Gupta, Stanford Linear Accelerator Center

December 15
School of Mathematics

Members Seminar: "Hyperbolic Lie Algebras and Hilbert Modular Surfaces"
James I. Lepowsky, Rutgers University; Visiting Member, School of Mathematics, IAS

School of Natural Sciences

Theoretical Physics Seminar: "Origin of Quark-Lepton Masses"
Varouzhan Baluni, Massachusetts Institute of Technology; Visiting Member, School of Natural Sciences, IAS

School of Social Science

Comparative Colonialism Seminar: "The Uses of Comparative History in Macrosocial Inquiry"
Theda Skocpol, Harvard University; Visiting Member, School of Social Science, IAS

December 16
School of Mathematics

Harish-Chandra Seminar: "The Weak Inequality and Automorphic Forms" (continued)
Harish-Chandra, Professor, School of Mathematics, IAS

Introduction to Algebraic Geometry Seminar: "The Categories of Presheaves and Sheaves of Abelian Groups on X Are Abelian and Have Enough Injectives"

	Richard E. Sot, University of Rochester; Visiting Member, School of Mathematics, IAS
December 17 School of Historical Studies	Colloquium in Classical Studies: "One of the Problems of Caesar" Andrew Alföldi, Professor Emeritus, School of Historical Studies, IAS
School of Mathematics	Complex Geometry Seminar: "Classification of Complex Surfaces (after Kodaira)" (continued) Richard Klotz, Stanford University; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS
December 18 School of Mathematics	Topology Seminar: "Singular Slices for Knots with Alexander Polynomial Equal to One" Michael Freedman, University of California at San Diego; Visiting Member, School of Mathematics, IAS
School of Natural Sciences	Theoretical Physics Seminar: "Global Symmetries of Spin Systems and Lattice Gauge Theories Defined on Finite Abelian Groups" Guest Lecturer: Mihail Marcu, University of Bonn
School of Social Science	Film: "Tiobriand Cricket: An Ingenious Response to Colonialism" by Jerry W. Leach and Gary Kildea Discussants: Annette B. Weiner, University of Texas at Austin, Visiting Member, School of Social Science, IAS; David N. Cannadine, Christ's College, Cambridge, England, Visiting Member, School of Historical Studies, IAS
	Seminar: "The Influence of Some Concepts Drawn from Science and Politics on Form in Twentieth-Century Architecture and City Planning" Richard Llewelyn-Davies, University of London; Director's Visitor, IAS
December 19 School of Mathematics	Complex Geometry Seminar: "Blowing Down Exceptional Curves in Surfaces" (continued) James Mackraz, University of California at San Diego; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS
December 22 School of Natural Sciences	Astrophysics Seminar: "Massive Neutrinos and Cosmology" Guest Lecturer: Ira Wasserman, Cornell University

January 8
School of Natural Sciences

Theoretical Physics Seminar: "Fractionally Charged Solitons in 1 + 1 Dimensions"
Guest Lecturer: J. Robert Schrieffer, University of California at Santa Barbara

January 12
School of Natural Sciences

Theoretical Physics Seminar: "Effective Action Approach to Mean Field Non-Abelian Statics and a Model of Bag Formation"
Stephen Adler, Professor, School of Natural Sciences, IAS

January 14
School of Mathematics

Complex Geometry Seminar: "Kodaira's Classification Theorem for Complex Surfaces"
Richard Klotz, Stanford University; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

January 15
School of Social Science

Seminar: "Classes and the State in America's New Deal: The Ironies of Government Intervention"
Theda Skocpol, Harvard University; Visiting Member, School of Social Science, IAS

January 16
School of Mathematics

Complex Geometry Seminar: "Blowing Down Exceptional Curves in Surfaces" (continued)
James Mackraz, University of California at San Diego; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

Differential Geometry Seminar: "A Nonlinear Hodge Theory for Gas Dynamics on Punctured Manifolds"
Penny Smith, University of California at Los Angeles; Visiting Member, School of Mathematics, IAS

January 19
School of Mathematics

Members Seminar: "Improvements in Some Oscillation Theorem Techniques for Certain Number Theoretic Problems"
James L. Hafner, University of Illinois; Visiting Member, School of Mathematics, IAS

School of Natural Sciences

Theoretical Physics Seminar: "A Gauge Invariant Approach to Two-Dimensional QCD"
Keiji Kikkawa, Hiroshima University, Japan; Visiting Member, School of Natural Sciences, IAS

School of Social Science

Comparative Colonialism Seminar: "Early Colonial Political Economy in South India"
Dharma Kumar, Delhi School of Economics, India; Visiting Member, School of Social Science, IAS

January 20
School of Mathematics

Lecture Series: "Algebraic Deformation Theory"
Murray Gerstenhaber, University of Pennsylvania; Visiting Member, School of Mathematics, IAS

Organizational Meeting: "Introduction to Algebraic Geometry" and "Simple Morphisms in Algebraic Geometry"
Richard E. Sot, University of Rochester; Visiting Member, School of Mathematics, IAS

Cohomology of Arithmetic Groups and Automorphic Forms Seminar: "General Remarks. Cohomology of the Boundary"
Armand Borel, Professor, School of Mathematics, IAS

January 21
School of Mathematics

Complex Geometry Seminar: "Kodaira's Classification Theorem for Complex Surfaces" (continued)
Richard Klotz, Stanford University; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

Complex Geometry Seminar: "Monge-Ampère Equation"
Shing-Tung Yau, Professor, School of Mathematics, IAS

January 22
School of Mathematics

Mathematical Physics Seminar: "Construction of Quantum Solitons in Two Space-Time Dimensions" (continued)
Basilis Gidas, Rockefeller University; Visiting Member, School of Mathematics, IAS

Several Complex Variables Seminar: "Extension of Analytic Functions"
William R. Zame, State University of New York at Buffalo; Visiting Member, School of Mathematics, IAS

Algebraic K-Theory (Organizational Meeting): "Topological Methods in Algebraic K-Theory"
Eric M. Friedlander, Northwestern University; Visiting Member, School of Mathematics, IAS

School of Social Science

Seminar: "God and Geometry: The Axiomatic Foundations of Geometry and the Ethical Foundations of Society in a

Nineteenth-Century Controversy"
Imre Toth, University of Regensburg, West Germany; Visiting Member, School of Historical Studies, IAS

January 23
School of Mathematics

Complex Geometry Seminar: "Deformation of Complex Structure" (continued)
James Mackraz, University of California at San Diego; Visiting Member, School of Mathematics, IAS

Differential Geometry Seminar: "Harmonic Maps from S^2 into CP^n"
Daniel M. Burns, Jr., University of Michigan; Visitor, School of Mathematics, IAS

January 26
School of Mathematics

Members Seminar: "Deformations of Foliations"
Steven E. Hurder, University of Illinois; Visiting Member, School of Mathematics, IAS

School of Natural Sciences

Theoretical Physics Seminar: "States of Half-Integral Angular Momentum in Quantum Gravity"
Rafael Sorkin, University of Chicago; Visiting Member, School of Natural Sciences, IAS

January 27
School of Mathematics

Seminar: "Monge-Ampère Equation"
Shing-Tung Yau, Professor, School of Mathematics, IAS

Lecture Series: "Algebraic Deformation Theory" (continued)
Murray Gerstenhaber, University of Pennsylvania; Visiting Member, School of Mathematics, IAS

Cohomology of Arithmetic Groups and Automorphic Forms Seminar: "Cohomology of the Boundary" (continued)
Armand Borel, Professor, School of Mathematics, IAS

January 28
School of Historical Studies

Colloquium in Classical Studies: "Alexandria and Realism in Hellenistic Art"
Nikolaus Himmelmann, University of Bonn; Visiting Member, School of Historical Studies, IAS

School of Mathematics

Simple Morphisms in Algebraic Geometry Seminar: "Theorem: Every Simple Local Algebra over a Field Is a Regular Local Ring"

Richard E. Sot, University of Rochester; Visiting Member, School of Mathematics, IAS

Complex Geometry Seminar: "Deformation of Complex Structure" (continued)
James Mackraz, University of California at San Diego; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

January 29
School of Mathematics

Mathematical Physics Seminar: "Construction of Quantum Solitons in Two Space-Time Dimensions" (continued)
Basilis Gidas, Rockefeller University; Visiting Member, School of Mathematics, IAS

Topology Seminar: "The Chromatic Hopf Invariant"
Guest Lecturer: M. Bendersky, Rider College

Several Complex Variables Seminar: "The Complex Monge-Ampère Equation and Algebraic Manifolds"
Daniel M. Burns, Jr., University of Michigan; Visitor, School of Mathematics, IAS

Algebraic K-Theory Seminar: "Introduction to Chern Classes for Higher K-Theory"
Guest Lecturer: Henri Gillet, Princeton University

School of Social Science

Seminar: "Authoritarian Regimes and Economic Performance"
Mrinal Datta-Chaudhuri, Delhi School of Economics, India; Visiting Member, School of Social Science, IAS

January 30
School of Mathematics

Differential Geometry Seminar: "A Nonlinear Hodge Theory for Gas Dynamics on Punctured Manifolds" (continued)
Penny Smith, University of California at Los Angeles; Visiting Member, School of Mathematics, IAS

February 2
School of Mathematics

Members Seminar: "Examples of Affine Manifolds"
John D. Smillie, Princeton University; Visiting Member, School of Mathematics, IAS

School of Social Science

Comparative Colonialism Seminar: "The Cultural Impact of Conquest and Colonization in Latin America"
Jacques Lafaye, Sorbonne; Visiting Member, School of Historical Studies, IAS

February 3
School of Mathematics

Seminar: "Monge-Ampère Equation" (continued)
Shing-Tung Yau, Professor, School of Mathematics, IAS

Cohomology of Arithmetic Groups and Automorphic Forms Seminar: "Cohomology of the Boundary" (continued)
Armand Borel, Professor, School of Mathematics, IAS

Diophantine Equations Seminar: "The Thue-Siegel Theorem"
Enrico Bombieri, Professor, School of Mathematics, IAS

February 4
School of Historical Studies

Colloquium in Classical Studies: "Brigands in Judaea"
Benjamin H. Isaac, Tel Aviv University; Visiting Member, School of Historical Studies, IAS

School of Mathematics

Simple Morphisms in Algebraic Geometry Seminar: "Some Properties Concerning Etale and Unramified Homomorphisms"
Richard E. Sot, University of Rochester; Visiting Member, School of Mathematics, IAS

Complex Geometry Seminar: "Deformation of Complex Structure" (continued)
James Mackraz, University of California at San Diego; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

February 5
School of Historical Studies

Art History Colloquium: "*The Perseus and Andromeda* on Rubens' House: Representation, Deception, and the Art of Painting"
Jeffrey Muller, Brown University; Visiting Member, School of Historical Studies, IAS

School of Mathematics

Mathematical Physics Seminar: "Isolated Systems in General Relativity"
Guest Lecturer: D. Cetkovic, Princeton University

Topology Seminar: "Flag Complexes for Some Discrete Groups"
Karen Vogtmann, University of Michigan; Visiting Member, School of Mathematics, IAS

Several Complex Variables Seminar: "C-R Equivalences of Weakly Pseudo-Convex Hypersurfaces in C^n"
Guest Lecturer: C. Han, University of Michigan

	Algebraic K-Theory Seminar: "Mayer-Vietoris for K-Theory with Coefficients" Guest Lecturer: Charles A. Weibel, Rutgers University
School of Social Science	Seminar: "Elite and State Building in Nineteenth-Century Brazil" José Murilo de Carvalho, University Research Institute, Rio de Janeiro; Visiting Member, School of Social Science, IAS
February 6 School of Mathematics	Differential Geometry Seminar: "Introduction to Fourier Integral Operator" Robert Bartnik, University of Melbourne; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS
	Differential Geometry Seminar: "Strongly Pseudo-Convex CR Structures over Small Balls" Guest Lecturer: M. Kuranishi, Columbia University
School of Natural Sciences	Theoretical Physics Seminar: "Exact Yang-Mills Monopole Solutions of Arbitrary Charge" Guest Lecturer: M. K. Prasad, Massachusetts Institute of Technology
February 9 School of Mathematics	Members Seminar: "Alternating Sum Formulas for Multiplicities in $L^2(\Gamma/G)$" Roberto J. Miatello, Universidade Federal de Pernambuco; Visiting Member, School of Mathematics, IAS
February 10 School of Mathematics	Seminar: "Monge-Ampère Equation" (continued) Shing-Tung Yau, Professor, School of Mathematics, IAS
	Lecture Series: "Algebraic Deformation Theory" (continued) Murray Gerstenhaber, University of Pennsylvania; Visiting Member, School of Mathematics, IAS
	Cohomology of Arithmetic Groups and Automorphic Forms Seminar: "Cohomology of Congruence Subgroups of SL_3 at Infinity" Joachim Schwermer, University of Bonn; Visiting Member, School of Mathematics, IAS

Diophantine Equations Seminar: "Dyson's Lemma"
Enrico Bombieri, Professor, School of Mathematics, IAS

February 11
School of Historical Studies

Colloquium in Classical Studies: "Hadrian's Policy in the Northern Black Sea Area"
Benjamin I. Nadel, The Bund Archives; Visiting Member, School of Historical Studies, IAS

School of Mathematics

Simple Morphisms in Algebraic Geometry Seminar: "Some Corollaries to the Theorem That a Simple Local Algebra over a Field Is a Local Ring"
Richard E. Sot, University of Rochester; Visiting Member, School of Mathematics, IAS

Complex Geometry Seminar: "Deformation of Complex Structure" (continued)
James Mackraz, University of California at San Diego; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

February 12
School of Mathematics

Mathematical Physics Seminar: "Isolated Systems in General Relativity" (continued)
Guest Lecturer: D. Cetkovic, Princeton University

Topology Seminar: "The Joy of Ends"
Guest Lecturer: F. Quinn, Princeton University

Several Complex Variables Seminar: "Galois Theory of Commutative Banach Algebras"
William R. Zame, State University of New York at Buffalo; Visiting Member, School of Mathematics, IAS

Algebraic K-Theory Seminar: "Finiteness for K_q of Curves over Finite Fields [after Quillen]"
Guest Lecturer: D. Grayson, Columbia University

Differential Geometry Seminar: "Introduction to Fourier Integral Operator" (continued)
Robert Bartnik, University of Melbourne; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

School of Social Science

Seminar: "Was There Private Property in Land in India before the British?"
Dharma Kumar, Delhi School of Economics, India; Visiting Member, School of Social Science, IAS

February 13
School of Mathematics

Series of Lectures: "Sieve Methods"
Atle Selberg, Professor, School of Mathematics, IAS

Differential Geometry Seminar: "Nielsen Extensions and Moduli of Riemann Surfaces"
Clifford J. Earle, Jr., Cornell University; Visiting Member, School of Mathematics, IAS

School of Social Science

Anthropology Seminar: "Problems in the Theoretical Approaches to the Study of Women in the Middle East"
Amal Rassam, Queens College, City University of New York; Visiting Member, School of Social Science, IAS

February 16
School of Mathematics

Differential Geometry Seminar: "Introduction to L^2-Cohomology of Singular Varieties"
Guest Lecturer: Leslie Saper, Princeton University

Members Seminar: "Isogeny of Elliptical Curves Defined over Q"
Monsur A. Kenku, University of Ibadan; Visiting Member, School of Mathematics, IAS

School of Social Science

Comparative Colonialism Seminar: "Islam and the Response to Colonialism in the Maghreb"
Jean-Claude Vatin, University of Aix-en-Provence; Visiting Member, School of Social Science, IAS

February 17
School of Mathematics

Seminar: "Monge-Ampère Equation" (continued)
Shing-Tung Yau, Professor, School of Mathematics, IAS

Lecture Series: "Algebraic Deformation Theory" (continued)
Murray Gerstenhaber, University of Pennsylvania; Visiting Member, School of Mathematics, IAS

Cohomology of Arithmetic Groups and Automorphic Forms Seminar: "Cohomology of Congruence Subgroups of SL_3 at Infinity" (continued)

Joachim Schwermer, University of Bonn; Visiting Member, School of Mathematics, IAS

Diophantine Equations Seminar: "Heights in Number Fields and Siegel's Lemma"
Enrico Bombieri, Professor, School of Mathematics, IAS

February 18
School of Historical Studies

Colloquium in Classical Studies: "The Agora in Pamphylian Seleuceia"
Jale Inan, University of Istanbul; Visiting Member, School of Historical Studies, IAS

School of Mathematics

Simple Morphisms in Algebraic Geometry Seminar: "Fitting Ideals and Proof of the Jacobian Criterion"
Richard E. Sot, University of Rochester; Visiting Member, School of Mathematics, IAS

Topology of Real Algebraic Varieties Seminar: "Real Algebraic Sets"
Henry C. King, University of Maryland; Visitor, School of Mathematics, IAS

Complex Geometry Seminar: "Deformation of Complex Structure" (continued)
James Mackraz, University of California at San Diego; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

February 19
School of Mathematics

Mathematical Physics Seminar: "Construction of Quantum Solitons in Two Space-Time Dimensions" (continued)
Basilis Gidas, Rockefeller University; Visiting Member, School of Mathematics, IAS

Topology Seminar: "Essential Annuli and Group Cohomology"
Gadde A. Swarup, Tata Institute; Visiting Member, School of Mathematics, IAS

Algebraic K-Theory Seminar: "K-Theory and L-Functions"
Guest Lecturer: Benedict Gross, Princeton University

Differential Geometry Seminar: "Introduction to Fourier Integral Operator" (continued)
Robert Bartnik, University of Melbourne; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

School of Social Science

Seminar: "The Uses of the Past in Early Islamic Historiography"
Stephen Humphreys, University of Chicago; Visiting Member, School of Social Science, IAS

February 20
School of Mathematics

Series of Lectures: "Sieve Methods" (continued)
Atle Selberg, Professor, School of Mathematics, IAS

Differential Geometry Seminar: "Euclidean and Conformal Invariants of Submanifolds"
Guest Lecturer: C. C. Hsiung, Lehigh University

School of Natural Sciences

Theoretical Physics Seminar: "Decoupling, Gauge Hierarchy, and Heavy Particle Effects"
Guest Lecturer: Edward Yao, University of Michigan

February 23
School of Mathematics

Mathematical Physics Seminar: "Construction of Quantum Solitons in Two Space-Time Dimensions" (continued)
Basilis Gidas, Rockefeller University; Visiting Member, School of Mathematics, IAS

Differential Geometry Seminar: "Introduction to L^2-Cohomology of Singular Varieties" (continued)
Guest Lecturer: Leslie Saper, Princeton University

Members Seminar: "Omega Results for Certain Arithmetic Functions"
R. Balasubramanian, Tata Institute; Visiting Member, School of Mathematics, IAS

School of Natural Sciences

Theoretical Physics Seminar: "Universal Critical Behavior of Some Simple Nonlinear Systems"
Colin Thompson, University of Melbourne; Visiting Member, School of Natural Sciences, IAS

February 24
School of Mathematics

Seminar: "Monge-Ampère Equation" (continued)
Shing-Tung Yau, Professor, School of Mathematics, IAS

Lecture Series: "Algebraic Deformation Theory" (continued)
Murray Gerstenhaber, University of Pennsylvania; Visiting Member, School of Mathematics, IAS

Cohomology of Arithmetic Groups and Automorphic Forms Seminar: "Cusp Forms for Arithmetic Quotients of Hyperbolic 3-Space"
Joachim Schwermer, University of Bonn; Visiting Member, School of Mathematics, IAS

Diophantine Equations Seminar: "The Thue-Siegel Theorem"
Enrico Bombieri, Professor, School of Mathematics, IAS

February 25
School of Historical Studies

Colloquium in Classical Studies: "Kaiser-Augst and the Legio I Martia"
Teodora Tomasevic-Buck, Curator of Kaiser-Augst; Visiting Member, School of Historical Studies, IAS

School of Mathematics

Simple Morphisms in Algebraic Geometry Seminar: "A Theorem on the Characterization of Simple Morphisms in Terms of the 1-Differentials and Separability of Certain Residue Class Field Extensions"
Richard E. Sot, University of Rochester; Visiting Member, School of Mathematics, IAS

Topology of Real Varieties Seminar: "Projective Varieties and Blowing Up"
Henry C. King, University of Maryland; Visitor, School of Mathematics, IAS

Complex Geometry Seminar: "Deformation of Complex Structure" (continued)
James Mackraz, University of California at San Diego; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

February 26
School of Mathematics

Topology Seminar: "Embeddings of Hilbert Cube Manifolds"
Luis Montejano, University of Utah; Visiting Member, School of Mathematics, IAS

Several Complex Variables Seminar: "Theta Functions and Curves in Abelian Varieties"
Guest Lecturer: Robert Gunning, Princeton University

Algebraic K-Theory Seminar: "On Waldhausen's Algebraic K-Theory of Topological Spaces"
Guest Lecturer: R. Staffeldt, Columbia University

Special Lecture: "Tensor Ranks and Their Applications to the Algebraic Complexity of Computations"
Viktor Y. Pan, IBM; Visiting Member, School of Mathematics, IAS

School of Social Science

Seminar: "The Rockites, 1821-1824: Social Composition and Leadership of an Irish Agrarian Rebellion"
James S. Donnelly, University of Wisconsin; Visiting Member, School of Social Science, IAS

February 27
School of Mathematics

Series of Lectures: "Sieve Methods" (continued)
Atle Selberg, Professor, School of Mathematics, IAS

Differential Geometry Seminar: "Problems of Grassmannization and Algebraization of Webs and Their Solutions (Recent Developments of S. S. Chern, P. A. Griffiths, M. A. Akivis, and V. Goldberg)"
Guest Lecturer: V. Goldberg, Lehigh University

School of Social Science

"Implications of the Notions of Language and Culture in Modern Urban Settings"
John Gumperz, University of California at Berkeley; Visiting Member, School of Social Science, IAS

March 2
School of Mathematics

Differential Geometry Seminar: "Introduction to L^2-Cohomology of Singular Varieties" (continued)
Guest Lecturer: Leslie Saper, Princeton University

Members Seminar: "The Span and the Stable Span of a Manifold"
Ulrich Korschorke, University of Siegen; Visiting Member, School of Mathematics, IAS

School of Natural Sciences

Theoretical Physics Seminar: "Stationary Points of the Effective Coupling and Singularities of the β-Function"
Wolfhart Zimmermann, Max Planck Institute for Physics; Visiting Member, School of Natural Sciences, IAS

School of Social Science

Comparative Colonialism Seminar: "Intermediaries and Collaborators in Colonial Systems"
Panel: Amal Rassam, Queens College, City University of New York, Visiting Member, School of Social Science, IAS; John Gumperz, University of California at Berkeley, Visiting

Member, School of Social Science, IAS; Jean-Claude Vatin, University of Aix-en-Provence, Visiting Member, School of Social Science, IAS; M. Crawford Young, University of Wisconsin at Madison, Visiting Member, School of Social Science, IAS

March 3
School of Mathematics

Seminar: "Monge-Ampère Equation" (continued)
Shing-Tung Yau, Professor, School of Mathematics, IAS

Cohomology of Arithmetic Groups and Automorphic Forms Seminar: "Cohomology and Eisenstein Series"
Armand Borel, Professor, School of Mathematics, IAS

Diophantine Equations Seminar: "Effective Cases of the Thue-Siegel Theorem"
Enrico Bombieri, Professor, School of Mathematics, IAS

March 4
School of Historical Studies

Colloquium in Classical Studies: "Histria: A Greek City on the Black Sea"
Petre Alexandrescu, Institute of Greek Archaeology; Visiting Member, School of Historical Studies, IAS

School of Mathematics

Special Lecture: "Minakshisundaram-Pleijel Coefficients of Locally Symmetric Spaces"
Roberto J. Miatello, Universidade Federal de Pernambuco; Visiting Member, School of Mathematics, IAS

Simple Morphisms in Algebraic Geometry Seminar: "A Local Algebra over a Field Is Simple If and Only If It Is Geometrically Regular"
Richard E. Sot, University of Rochester; Visiting Member, School of Mathematics, IAS

Topology of Real Varieties Seminar: "On Algebraic Blowing Up and Blowing Down"
Henry C. King, University of Maryland; Visitor, School of Mathematics, IAS

Complex Geometry Seminar: "K3 Surfaces: Review, and Introduction to Moduli"
James Mackraz, University of California at San Diego; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

March 5

School of Mathematics

Mathematical Physics Seminar: "Construction of Quantum Solitons in Two Space-Time Dimensions" (continued)
Basilis Gidas, Rockefeller University; Visiting Member, School of Mathematics, IAS

Topology Seminar: "On the Homotopy Theory of Moore Spaces"
Joseph A. Neisendorfer, Ohio State University; Visiting Member, School of Mathematics, IAS

Several Complex Variables Seminar: "Boundary Values of Meromorphic Functions, the Kobayashi Metric and the Lindelöf Principle"
Steven G. Krantz, University of California at Los Angeles; Visiting Member, School of Mathematics, IAS

Algebraic K-Theory Seminar: "Algebraic K-Theory and Etale Cohomology"
Guest Lecturer: R. Thomason, Massachusetts Institute of Technology

Differential Geometry Seminar: "Introduction to Fourier Integral Operator with Applications to Eigenvalue Distributions"
Robert Bartnik, University of Melbourne; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

School of Social Science

Seminar: "Models of Post-Authoritarian Democracy in South America"
Robert Kaufman, Rutgers University; Visiting Member, School of Social Science, IAS

March 6

School of Mathematics

Series of Lectures: "Sieve Methods" (continued)
Atle Selberg, Professor, School of Mathematics, IAS

Seminar on Thurston's Notes: "Chapters 3 and 4"
John D. Smillie, Princeton University; Visiting Member, School of Mathematics, IAS

Differential Geometry Seminar: "An Introduction to Twistor Theory"
Michael G. Eastwood, University of Oxford; Visiting Member, School of Mathematics, IAS

School of Natural Sciences

Theoretical Physics Seminar: "Stochastic Quantization According to Parisi and Wu Yang-shi"
Guest Lecturer: Edouard Brézin, Saclay

March 9
School of Mathematics

Hermann Weyl Lecture Series: "The Structure of Complexity Classes"
Guest Lecturer: R. M. Karp, University of California at Berkeley

March 10
School of Mathematics

Seminar: "Monge-Ampère Equation" (continued)
Shing-Tung Yau, Professor, School of Mathematics, IAS

Cohomology of Arithmetic Groups and Automorphic Forms Seminar: "Cohomology and Eisenstein Series" (continued)
Armand Borel, Professor, School of Mathematics, IAS

Diophantine Equations Seminar: "Integral Points on Curves"
Enrico Bombieri, Professor, School of Mathematics, IAS

March 11
School of Mathematics

Several Complex Variables Seminar: "Twistors II"
Michael G. Eastwood, University of Oxford; Visiting Member, School of Mathematics, IAS

Topology of Real Varieties Seminar: "Geometric Operations on Algebraic Sets"
Selman Akbulut, Rutgers University; Visiting Member, School of Mathematics, IAS

Special Lecture: "Representations of Weyl Groups and Cohomology"
Guest Lecturer: T. A. Springer, University of Utrecht

Complex Geometry Seminar: "K3 Surfaces: Introduction to Moduli" (continued)
James Mackraz, University of California at San Diego; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

March 12
School of Mathematics

Mathematical Physics Seminar: "Eigenvalues on a Manifold of Negative Curvature"
Robert Bartnik, University of Melbourne; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

Topology Seminar: "Free Actions of Finite Groups on Projective Varieties"
Guest Lecturer: Nicholas Katz, Princeton University

Hermann Weyl Lecture Series: "The Structure of Complexity Classes" (continued)
Guest Lecturer: R. M. Karp, University of California at Berkeley

School of Social Science

Seminar: "The Secret Ballot: How Progressive a Reform?"
Andreas Teuber, University of Washington; Visiting Member, School of Social Science, IAS

March 13
School of Mathematics

Series of Lectures: "Sieve Methods" (continued)
Atle Selberg, Professor, School of Mathematics, IAS

Seminar on Thurston's Notes: "Chapters 3 and 4" (continued)
John D. Smillie, Princeton University; Visiting Member, School of Mathematics, IAS

Differential Geometry Seminar: "On the Polynomial of I. N. Bernstein—Some Results and Conjectures"
Benjamin L. Lichtin, Institute for Defense Analyses; Visiting Member, School of Mathematics, IAS

March 16
School of Mathematics

Special Lecture: "Existence of Invariant Measures for Groups of Transformations"
D. Ramachandran, Indian Statistical Institute; Visiting Member, School of Mathematics, IAS

Hermann Weyl Lecture Series: "The Structure of Complexity Classes" (continued)
Guest Lecturer: R. M. Karp, University of California at Berkeley

School of Social Science

Comparative Colonialism Seminar: "Colonialization in the Ancient World: Rome in the Eastern Mediterranean"
Glen W. Bowersock, Professor, School of Historical Studies, IAS

March 17
School of Mathematics

Seminar: "Monge-Ampère Equation" (continued)
Shing-Tung Yau, Professor, School of Mathematics, IAS

Cohomology of Arithmetic Groups and Automorphic Forms

Seminar: "Cohomology and Eisenstein Series" (continued)
Armand Borel, Professor, School of Mathematics, IAS

Diophantine Equations Seminar: "Integral Points on Curves" (continued)
Enrico Bombieri, Professor, School of Mathematics, IAS

March 18
School of Mathematics

Differential Geometry Seminar: "On the Polynomial of I. N. Bernstein—Some Results and Conjectures" (continued)
Benjamin L. Lichtin, Institute for Defense Analyses; Visiting Member, School of Mathematics, IAS

Topology of Real Varieties Seminar: "Isotoping Smooth Manifolds to Algebraic Sets and Algebraic Bordism"
Selman Akbulut, Rutgers University; Visiting Member, School of Mathematics, IAS

Complex Geometry Seminar: "K3 Surfaces: Introduction to Moduli" (continued)
James Mackraz, University of California at San Diego; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

March 19
School of Mathematics

Mathematical Physics Seminar: "Propagation of Singularities for Analytic Partial Differential Equations"
Nicholas W. Hanges, Rutgers University; Visiting Member, School of Mathematics, IAS

Topology Seminar: "Steenrod's Problem and K-Invariants of Certain Classifying Spaces"
Peter J. Kahn, Cornell University; Visiting Member, School of Mathematics, IAS

Algebraic K-Theory Seminar: "Some Applications of K-Theory in Topology"
Guest Lecturer: Wu-chung Hsiang, Princeton University

School of Social Science

Seminar: "Linnaeus's *Nemesis Divina* and the Idea of Retaliation in the Eighteenth Century"
Wolf Lepenies, Free University of Berlin; Visiting Member, School of Social Science, IAS

Film: "Niai, the Story of a !Kung Woman" by John Marshall
Discussant: Annette B. Weiner, University of Texas at Austin; School of Social Science, IAS

March 20
School of Mathematics

Differential Geometry Seminar: "Harmonic Foliations"
Franz W. Kamber, University of Illinois; Visiting Member, School of Mathematics, IAS

Seminar on Thurston's Notes: "Chapters 3 and 4" (continued)
John D. Smillie, Princeton University; Visiting Member, School of Mathematics, IAS

March 23
School of Mathematics

Special Lecture: "Ergodic Theory for Complex Continued Fractions"
Asmus L. Schmidt, University of Copenhagen; Visiting Member, School of Mathematics, IAS

Members Seminar: "The Representation of Finite Groups of Lie Type"
Michio Suzuki, University of Illinois; Visiting Member, School of Mathematics, IAS

March 24
School of Mathematics

Seminar: "Monge-Ampère Equation" (continued)
Shing-Tung Yau, Professor, School of Mathematics, IAS

Differential Geometry Seminar: "Proof of the Existence of Polynomial of I. N. Bernstein"
Benjamin L. Lichtin, Institute for Defense Analyses; Visiting Member, School of Mathematics, IAS

Cohomology of Arithmetic Groups and Automorphic Forms Seminar: "Cohomology and Eisenstein Series" (continued)
Armand Borel, Professor, School of Mathematics, IAS

Diophantine Equations Seminar: "A Liouville Theorem on Curves"
Enrico Bombieri, Professor, School of Mathematics, IAS

March 25
School of Mathematics

Topology of Real Varieties Seminar: "Characterizing Isolated Singularities"
Henry C. King, University of Maryland; Visitor, School of Mathematics, IAS

Complex Geometry Seminar: "K3 Surfaces: Introduction to Moduli" (continued)

James Mackraz, University of California at San Diego; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

Special Lecture: "Randomizing Algorithms in Mathematics and Computing"
Guest Lecturer: Michael Rabin, Hebrew University of Jerusalem and Harvard University

March 26
School of Mathematics

Mathematical Physics Seminar: "Propagation of Singularities for Analytic Partial Differential Equations" (continued)
Nicholas W. Hanges, Rutgers University; Visiting Member, School of Mathematics, IAS

Topology Seminar: "Commuting Vector Fields"
Guest Lecturer: T. Petrie, Rutgers University

Several Complex Variables Seminar: "Intersection Theory and Geometry of Real Hypersurfaces"
Guest Lecturer: J. DeAngelo, Princeton University

Algebraic K-Theory Seminar: "On the Congruence Subgroup Problem"
Gopal Prasad, Tata Institute; Visiting Member, School of Mathematics, IAS

Differential Geometry Seminar: "Gravitational Radiation According to Bondi"
Robert Bartnik, University of Melbourne; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

School of Social Science

Film: "Crosstalk" (BBC)
Discussant: John Gumperz, University of California at Berkeley; Visiting Member, School of Social Science, IAS

Seminar: "On the Charismatic Nature of Gaullism"
Jacques Julliard, Ecole des Hautes Etudes en Sciences Sociales; Visiting Member, School of Social Science, IAS

March 27
School of Mathematics

Series of Lectures: "Sieve Methods" (continued)
Atle Selberg, Professor, School of Mathematics, IAS

Differential Geometry Seminar: "On Self-Conformal Mappings of Riemann Surfaces"

James A. Jenkins, Washington University; Visiting Member, School of Mathematics, IAS

School of Natural Sciences

Theoretical Physics Seminar: "Long Distance Behavior of the Running Coupling Constant in Yang-Mills Theory"
Guest Lecturer: Marshall Baker, University of Washington

March 30
School of Mathematics

Members Seminar: "Formula for Dimension of Spaces of Siegel Modular Forms: Application of the Formula of Riemann-Roch-Hirzebruch-Atiyah-Singer"
Ryuji Tsushima, Gakushuin University; Visiting Member, School of Mathematics, IAS

School of Social Science

Comparative Colonialism Seminar: "Japan as a Colonial Power"
Guest Lecturer: Marius Jansen, Princeton University

March 31
School of Mathematics

Seminar: "Monge-Ampère Equation" (continued)
Shing-Tung Yau, Professor, School of Mathematics, IAS

Cohomology of Arithmetic Groups and Automorphic Forms Seminar: "Unitary Representations of $SL_n(R)$ and Cohomology of Congruence Subgroups"
Guest Lecturer: B. Speh, Cornell University

Diophantine Equations Seminar: "A Liouville Theorem on Curves" (continued)
Enrico Bombieri, Professor, School of Mathematics, IAS

April 1
School of Mathematics

Differential Geometry Seminar: "Gravitational Radiation According to Bondi" (continued)
Robert Bartnik, University of Melbourne; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

Differential Geometry Seminar: "On Homotopy 4-Spheres"
Selman Akbulut, Rutgers University; Visiting Member, School of Mathematics, IAS

Topology of Real Varieties Seminar: "Characterizing Isolated Singularities" (continued)
Henry C. King, University of Maryland; Visitor, School of Mathematics, IAS

Complex Geometry Seminar: "The Period Mapping Is Holomorphic"
James Mackraz, University of California at San Diego; Assistant to Professor Shing-Tung Yau, School of Mathematics, IAS

April 2
School of Mathematics

Topology Seminar: "Hermitian K-Theory of Topological Spaces and Automorphisms of Manifolds"
Guest Lecturer: D. Burghelea, Ohio State University

Several Complex Variables Seminar: "Complete Kähler Domains"
Guest Lecturer: K. Diederich, Princeton University

Algebraic K-Theory Seminar: "The Bass-Quillen Conjecture"
Guest Lecturer: Charles Weibel, Rutgers University

School of Social Science

Seminar: "From Passions to Emotions and Sentiments: Descartes, Spinoza, Hume and Rousseau"
Amelie Rorty, Rutgers University; Visiting Member, School of Social Science, IAS

April 3
School of Mathematics

Series of Lectures: "Sieve Methods" (continued)
Atle Selberg, Professor, School of Mathematics, IAS

Seminar on Thurston's Notes: "Chapters 3 and 4" (continued)
John D. Smillie, Princeton University; Visiting Member, School of Mathematics, IAS

Special Lecture: "Theta Functions with Harmonic Functions as Coefficients"
Guest Lecturer: E. Freitag, Heidelberg University and Harvard University

School of Social Science

Film: "Jaguar"
Discussant: Annette Weiner, University of Texas at Austin; Visiting Member, School of Social Science, IAS

April 6
School of Natural Sciences

Theoretical Physics Seminar: "Spin Networks Are Simplicial Quantum Gravity"
Guest Lecturer: Malcolm J. Perry, Princeton University

School of Social Science	Comparative Colonialism Seminar: "The Post-Colonial State in Nineteenth-Century Brazil" Jose Murilo de Carvalho, IUPERJ, Rio de Janeiro; Visiting Member, School of Social Science, IAS
April 7 School of Mathematics	Cohomology of Arithmetic Groups and Automorphic Forms Seminar: "Cohomology and Eisenstein Series" (continued) Armand Borel, Professor, School of Mathematics, IAS
April 8 School of Mathematics	Topology of Real Varieties Seminar: "Local Knottedness of Real Varieties" Selman Akbulut, Rutgers University; Visiting Member, School of Mathematics, IAS
April 9 School of Mathematics	Special Lecture: "Was Euler an Ancestor of Bourbaki?" André Weil, Professor Emeritus, School of Mathematics, IAS
School of Social Science	Seminar: "The Merchants of Frankfurt am Main (1814-1864): The Transformation from Estate to Bourgeoisie" Allan Sharlin, University of California at Berkeley; Visiting Member, School of Social Science, IAS
April 10 School of Mathematics	Series of Lectures: "Sieve Methods" (continued) Atle Selberg, Professor, School of Mathematics, IAS
School of Social Science	Anthropology Seminar: "Reciprocity and Exchange Theory" Annette Weiner, University of Texas at Austin; Visiting Member, School of Social Science, IAS
April 13 School of Social Science	Comparative Colonialism Seminar: "Comparative Latin American Colonialism" Robert Kaufman, Douglass College, Rutgers University; Visiting Member, School of Social Science, IAS
April 15 School of Mathematics	Topology of Real Varieties Seminar: "Obstructions to Moving Submanifolds to Algebraic Subsets" Selman Akbulut, Rutgers University; Visiting Member, School of Mathematics, IAS

April 16 School of Social Science	Seminar: "Pasteur Revisited: The Slow Making of the First Bio-Medical Revolution" Claire Salomon-Bayet, CNRS, France; Visiting Member, School of Historical Studies, IAS
April 23 School of Social Science	Seminar: "Power and Irrationality in Classical Antiquity: The Work of Paul Veyne" Guest Lecturer: Jon Elster, University of Oslo
April 24 School of Natural Sciences	Theoretical Physics Seminar: "Equilibrium and Kinetic Description of Phase Transitions" Joel Lebowitz, Rutgers University; Visiting Member, School of Natural Sciences, IAS
April 30 School of Social Science	Seminar: "Mullah, Madhi, and Mosque: Political Trends in Muslim Society" Akbar S. Ahmed, South Waziristan Agency, Pakistan; Visiting Member, School of Social Science, IAS
May 4 School of Natural Sciences	Seminar: "A Monte Carlo Study of the U(2) Chiral Model" Stuart Samuel, University of California at Berkeley; Visiting Member, School of Natural Sciences, IAS
May 7 School of Social Science	Seminar: "Spirituality and Mobilization: Recent Popular Religious Revivals in the Maghreb" Jean-Claude Vatin, University of Aix-en-Provence; Visiting Member, School of Social Science, IAS
May 14 School of Social Science	Seminar: "The Development of the British Historical Profession, 1850-1922" Doris Goldstein, Yeshiva University; Visiting Member, School of Historical Studies, IAS
June 15 School of Natural Sciences	Theoretical Physics Seminar: "Tunnelling at Finite Temperature and Complex Time" Emil Mottola, Columbia University; Visiting Member, School of Natural Sciences, IAS

In addition, the following events of interest to the Institute community were presented by the Archaeological Institute of America.

October 21	Lecture Series: "Excavations at Tepe Nush-I Jan, Iran: The Rediscovery of Ancient Media" Guest Lecturer: David Stronach, The British Institute for Persian Studies
November 11	Lecture Series: "The Horses of San Marco" Guest Lecturer: Mary B. Moore, Hunter College
December 8	Lecture Series: "The Sculpture of Aphrodisias" Guest Lecturer: Kenan T. Erim, New York University
February 10	Lecture Series: "An Early Planned City in Greece—Excavations at Halieis" Guest Lecturer: Thomas D. Boyd, University of Texas at Austin
March 3	Lecture Series: "The Antiquities Market and Archaeology" Guest Lecturer: Karen D. Vitelli, Indiana University
March 31	Lecture Series: "Aspects of Realism in Greek Art" Nikolaus Himmelmann, University of Bonn; Visiting Member, School of Historical Studies, IAS

Report of the Treasurer

The market value of the Institute's endowment totaled $98,734,342 on June 30, 1981. This represents an increase of $16,009,979 or 19 percent over the comparable total for June 30, 1980.

During the fiscal year, total operating expenditures were $8,480,426. After applying $2,115,342 in special purpose gifts and grants against these expenditures, the Institute was required to provide $6,365,084 from endowment resources. This represents approximately 7.0 percent of the average of the endowment market values at June 30, 1981, and June 30, 1980, as compared to 7.1 percent of the comparable endowment totals for fiscal year 1980.

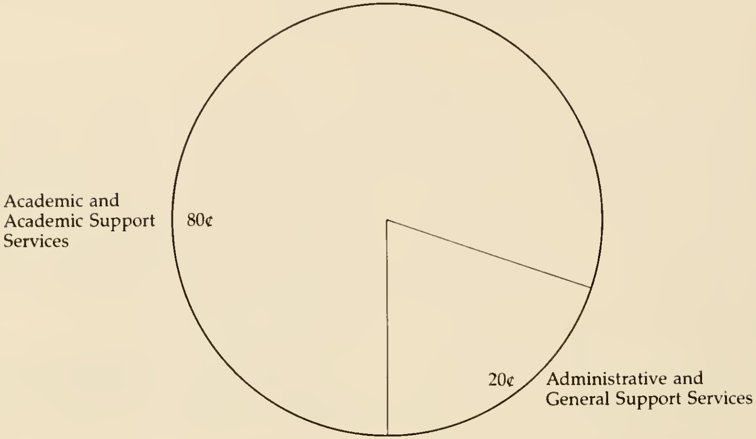
The performance of the Institute's portfolio is measured annually by Hamilton, Johnston & Co., Inc. Over the seven-year period ending June 30, 1981, dividend and interest income and net realized and unrealized gains combined for a total average annual compound rate of return on Institute investments of 17.8 percent. Over the past four years, the average annual compound rate of return was 19.7 percent. For fiscal 1981, the annual rate of return was 19.5 percent.

The financial statements of the Institute for Advanced Study are audited by Deloitte Haskins + Sells. The auditors' opinion letter and statements for the fiscal year ended June 30, 1981, follow this report.

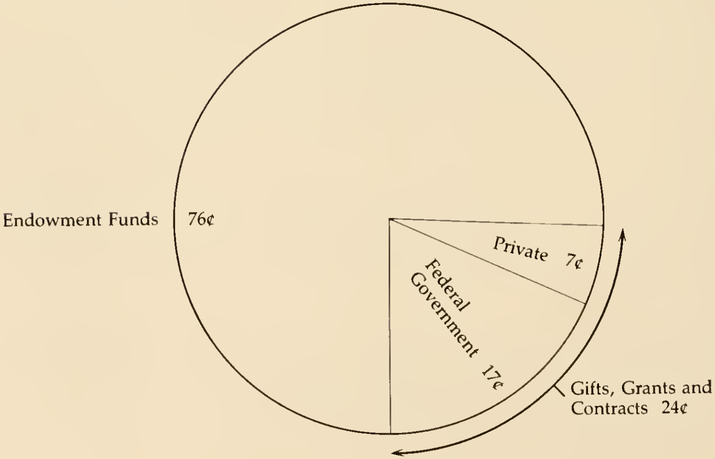
Ralph E. Hansmann
Treasurer

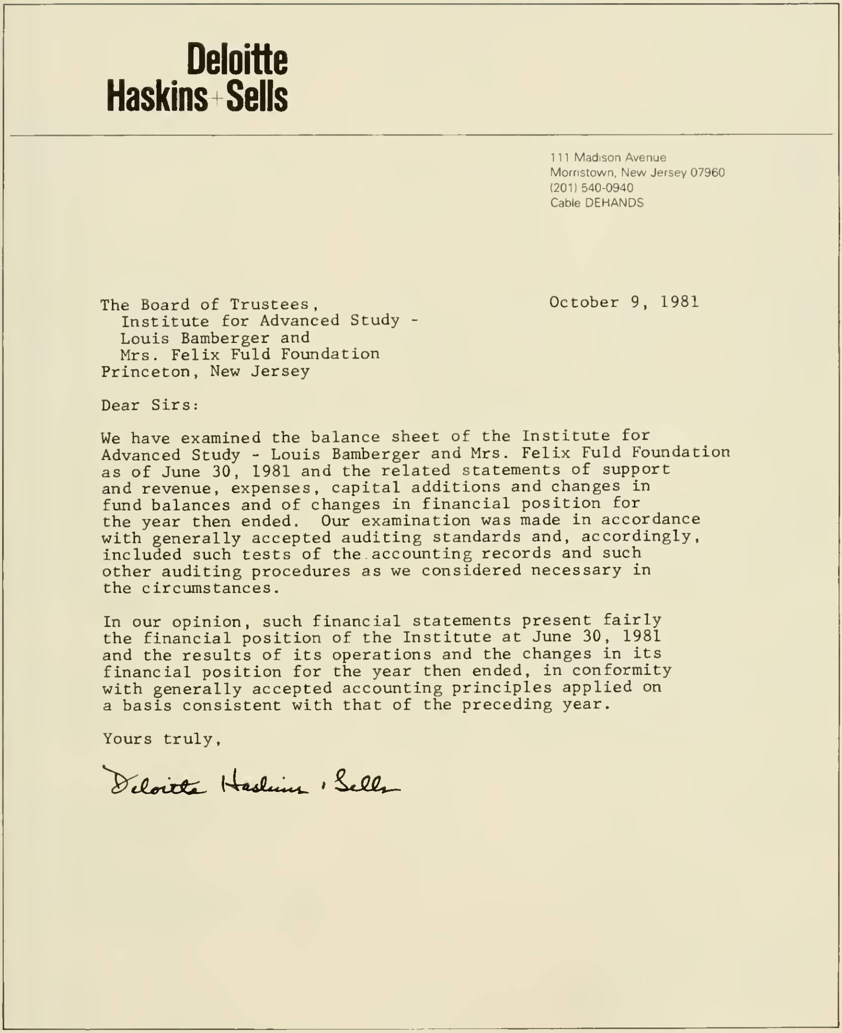
Operations

The Institute Expense Dollar
Fiscal Year 1981



The Institute Income Dollar
Fiscal Year 1981





Deloitte
Haskins + Sells

111 Madison Avenue
Morristown, New Jersey 07960
(201) 540-0940
Cable DEHANDS

October 9, 1981

The Board of Trustees,
Institute for Advanced Study -
Louis Bamberger and
Mrs. Felix Fuld Foundation
Princeton, New Jersey

Dear Sirs:

We have examined the balance sheet of the Institute for Advanced Study - Louis Bamberger and Mrs. Felix Fuld Foundation as of June 30, 1981 and the related statements of support and revenue, expenses, capital additions and changes in fund balances and of changes in financial position for the year then ended. Our examination was made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, such financial statements present fairly the financial position of the Institute at June 30, 1981 and the results of its operations and the changes in its financial position for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Yours truly,

Deloitte Haskins + Sells

Institute for Advanced Study
Louis Bamberger and Mrs. Felix Fuld Foundation

Exhibit A

Balance Sheet, June 30, 1981

ASSETS		
Operating Funds:		
Cash		$ 58,366
Accounts and notes receivable		91,246
Government receivable		101,834
Specific purpose funds receivable		9,859
Accrued income on investments		678,288
Deferred charges		101,671
Total operating funds		$ 1,041,264
Plant Funds:		
Cash		$ 35,888
Debt service fund deposits		424,654
Marketable securities (at cost which approximates market)		2,804,806
Unamortized debt expense		91,292
Land, buildings and improvements, equipment and library books (including rare book collection)	C	12,089,726
Total plant funds		$15,446,366
Endowment and Similar Funds:	B	
Cash		$ 213,472
Investment accounts receivable		1,083,596
Marketable securities	D	86,180,453
Mortgages and notes receivable		1,298,579
Total endowment and similar funds		$88,776,100
LIABILITIES AND FUND BALANCES		
Operating Funds:		
Accounts payable, accrued expenses, etc.		$ 138,005
Deferred restricted revenue	G	146,753
Fund balance (Exhibit B)—unrestricted		756,506
Total operating funds		$ 1,041,264
Plant Funds:		
Interest payable	D	$ 329,654
Bonds payable	D	9,294,309
6¼% note payable	D	43,924
Plant funds balance (Exhibit B)		5,778,479
Total plant funds		$15,446,366
Endowment and Similar Funds:		
Investment accounts payable		$ 235,800
Fund balances (Exhibit B):		
Endowment funds		19,932,173
Quasi-endowment funds		68,608,127
Total endowment and similar funds		$88,776,100

See summary of significant accounting policies and notes to financial statements.

Louis Bamberger and Mrs. Felix Fuld Foundation

Exhibit B

Statement of Support and Revenue, Expenses, Capital Additions, and Changes in Fund Balances for the Year Ended June 30, 1981

	Operating Funds		*Plant Funds*	*Endowment & Similar Funds*	*Total All Funds*
	Unrestricted	*Restricted*			
Support and Revenue:					
Endowment income (net of management fees)	$5,193,225	$1,380,885			$ 6,574,110
Contributions	346,841	1,376,457			1,723,298
Government contracts	124,191	267,853			392,044
Total support and revenue	5,664,257	3,025,195			8,689,452
Expenses:					
School of Mathematics	825,438	602,897	$ 88,779		1,517,114
School of Natural Sciences	858,165	592,394	71,441		1,522,000
School of Historical Studies	1,158,091	311,972	84,045		1,554,108
School of Social Science		827,821	55,990		883,811
Library	354,404		57,283		411,687
Director's Special Purpose Fund	11,653	97,905	1,859		111,417
Administration and General	2,085,100	92,284	83,543		2,260,927
Auxiliary Activity - tenants' housing expenses net of $48,771 of revenue	137,505	59,862	21,995		219,362
Total expenses	5,430,356	2,585,135	464,935		8,480,426
Excess (deficiency) of support and revenue over expenses after capital additions	233,901	440,060	(464,935)		209,026
Capital Additions:					
Gifts				$ 560,497	560,497
Realized net gains on investments			48,604	10,137,005	10,185,609
Investment income			344,664		344,664
Total capital additions			393,268	10,697,502	11,090,770
Excess (deficiency) of support and revenue over expenses after capital additions	233,901	440,060	(71,667)	10,697,502	11,299,796
Fund Balances at Beginning of Year:	989,981	- 0 -	10,871,150	71,914,358	83,775,489
Transfers:					
Proceeds from disposal of plant facilities	160,024		(160,024)		
Plant acquisitions and principal debt service payments	(1,179,355)	(36,224)	1,215,579		
Portion of quasi-endowment funds appropriated	436,490			(436,490)	
Transfers to quasi-endowment funds			(6,076,559)	6,076,559	
Transfers to endowment and similar funds		(230,589)		230,589	
Transfers to unrestricted current funds	171,815	(171,815)			
Others - net	(56,350)	(1,432)		57,782	
Fund Balances at End of Year:	$ 756,506	$ - 0 -	$ 5,778,479	$88,540,300	$95,075,285

See summary of significant accounting policies and notes to financial statements.

Louis Bamberger and Mrs. Felix Fuld Foundation

Exhibit C

Statement of Changes in Financial Position
for the Year Ended June 30, 1981

	Operating Funds	*Plant Funds*	*Endowment & Similar Funds*	*Total All Funds*
Resources Provided:				
Excess (deficiency) of support and revenue over expenses before capital additions	$ 673,961	$ (464,935)		$ 209,026
Capital additions:				
Gifts			$ 560,497	560,497
Realized net gains on investments		48,604	10,137,005	10,185,609
Investment income		344,664		344,664
Excess (deficiency) of support and revenue over expenses after capital additions	673,961	(71,667)	10,697,502	11,299,796
Items not using (providing) resources:				
Provision for depreciation		464,935		464,935
(Gain) on disposition of plant facilities		(48,604)		(48,604)
(Gain) on disposition of investments - net			(10,137,005)	(10,137,005)
Proceeds from sale of investments			255,958,996	255,958,996
Proceeds from issuance of bonds (net of discount)		8,665,309		8,665,309
Proceeds from sale of plant facilities		160,024		160,024
Decrease in receivables	379,905			379,905
Increase in interest payable		329,654		329,654
Total resources provided	1,053,866	9,499,651	256,519,493	267,073,010
Resources Used:				
Purchases of investments			258,994,436	258,994,436
Purchases of plant facilities and equipment		1,091,315		1,091,315
Increase in accrued income	6,150			6,150
Increase in deferred charges	22,477			22,477
Decrease in accounts payable	30,009		2,016,387	2,046,396
Decrease in deferred restricted revenue	44,028			44,028
Increase in debt service fund deposits		424,654		424,654
Increase in marketable securities		2,804,806		2,804,806
Increase in unamortized debt service expense		91,292		91,292
Increase in receivables			1,283,995	1,283,995
Reduction of bond and note payables		46,192		46,192
Total resources used	102,664	4,458,259	262,294,818	266,855,741
Transfers:				
Proceeds from disposal of plant facilities	160,024	(160,024)		
Plant acquisitions and principal debt service payments	(1,215,579)	1,215,579		
Portion of quasi-endowment funds appropriated	436,490		(436,490)	
Transfers to quasi-endowment funds		(6,076,559)	6,076,559	
Transfers to endowment and similar funds	(230,589)		230,589	
Others - Net	(57,782)		57,782	
Total transfers	(907,436)	(5,021,004)	5,928,440	
Increase in cash	$ 43,766	$ 20,388	$ 153,115	$ 217,269

See summary of significant accounting policies and notes to financial statements.

Summary of Significant Accounting Policies
June 30, 1981

The Institute for Advanced Study, an independent, private institution devoted to the encouragement, support, and patronage of learning, was founded in 1930 as a community of scholars where intellectual inquiry could be carried out in the most favorable circumstances.

Focused on mathematics and classical studies at the outset, the Institute today consists of the School of Historical Studies, the School of Mathematics, the School of Natural Sciences, and the School of Social Science. Each School has a small permanent faculty, and some 160 fellowships are awarded annually to visiting members from other research institutions and universities throughout the world.

The objectives of the Institute were described as follows in the Founders' original letter to the first Trustees: "The primary purpose is the pursuit of advanced learning and exploration in fields of pure science and high scholarship to the utmost degree that the facilities of the institution and the ability of the faculty and students will permit."

Though none of the visiting members are students in the narrow sense of being degree candidates, educational growth is still before them. The Institute devotes special attention to identifying young people of accomplishment and promise, and offers them membership at a stage in their careers when independent work is of the highest importance to their intellectual development.

Accrual Basis

The financial statements of the Institute have been prepared on the accrual basis. The significant accounting policies followed are described below to enhance the usefulness of the financial statements to the reader.

Plant Assets and Depreciation

Uses of operating funds for plant acquisitions and principal debt service payments are accounted for as transfers to plant funds. Proceeds from the sale of plant assets, if unrestricted, are transferred to operating fund balances, or, if restricted, to deferred amounts restricted for plant acquisitions. Depreciation is provided over the estimated useful lives of the respective assets on a straight-line basis (buildings and capital improvements 20-40 years, equipment 3-6 years).

Fund Accounting

The accounts of the Institute are maintained in accordance with the principles of "fund accounting." This is the procedure by which resources for various purposes are classified for accounting and reporting purposes into funds that are in accordance with activities or objectives specified. Separate accounts are maintained for each fund; however, in the accompanying financial statements, funds that have similar characteristics have been combined into fund groups.

Fund balances restricted by outside sources are so indicated and are distinguished from unrestricted funds allocated to specific purposes by action of the governing board. Externally restricted funds may only be utilized in accordance with the purpose established by the source of such funds and are in contrast with unrestricted funds over which the governing board retains full control to use in achieving any of its institutional purposes.

Endowment funds are subject to the restrictions of gift instruments requiring in perpetuity that the principal be invested and the income only be utilized. Quasi-endowment funds have been established by the governing board to function as endowment funds and any portion of these funds may be expended.

All gains and losses arising from the sale, collection, or other disposition of investments and other non-cash assets are accounted for in the fund which owned such assets. Ordinary income derived from investments, receivables, and the like, is accounted for in the fund owning such assets, except for income derived from investments of endowment and similar funds, which income, if unrestricted, is accounted for as revenue in unrestricted operating funds, or if restricted, as deferred restricted revenue until used in accordance with the terms of the restriction.

Other Significant Accounting Policies

Other significant accounting policies are set forth in the financial statements and notes thereto.

Notes to Financial Statements
June 30, 1981

A.

The accompanying financial statements are presented in accordance with certain recommendations contained in Statement of Position No. 78-10 of the American Institute of Certified Public Accountants titled, Accounting Principles and Reporting Practices for Certain Nonprofit Organizations.

B.

Investments purchased by the Institute are recorded at cost; investments received by gift are carried at fair market value at the date of acquisition. Quoted market value of endowment and similar fund investments aggregated $97,673,074 at June 30, 1981.

Assets of endowment and similar funds, except nonmarketable investments restricted for the School of Social Science having a book value of $2,500,000, are pooled with each individual fund subscribing to or disposing of units on the basis of the market value per unit on a quarterly basis.

The following tabulation summarizes changes in relationships between cost and market values of the pooled investments:

	Pooled Assets		*Net*	*Market*
	Market Value	*Carrying Value*	*Increase (Decrease)*	*Value Per Unit*
June 30, 1981	$95,756,133	$86,040,327	$ 9,715,806	$4,214
July 1, 1980	80,168,788	69,414,369	10,754,419	3,811
Change in unrealized appreciation for the year ended June 30, 1981			(1,038,613)	
Realized net gain for the year ended June 30, 1981			10,137,005	
Net gain for the year ended June 30, 1981			$ 9,098,392	

Earnings per unit, exclusive of net gains, amounted to $300 for the year ended June 30, 1981.

C.

Physical plant and equipment are stated at cost at date of acquisition, less accumulated depreciation. The cost of library books, other than rare books purchased subsequent to June 30, 1947, has not been capitalized. It is not practicable to determine the value of such books.

A summary of plant assets follows:

Land	$ 2,269,397
Buildings and improvements	14,719,141
Equipment	2,018,069
Library books	196,238
Total	19,202,845
Less accumulated depreciation	7,113,119
Net book value	$12,089,726

D.

A summary of bonds payable follows:

2.75%, 1956 - Apartment Bonds	$ 629,000
7.804%, 1980 - NJEFA Series A Revenue Bonds	8,775,000
Total	9,404,000
Unamortized bond discount	109,691
Total bonds payable	$ 9,294,309

On July 24, 1980, the Institute for Advanced Study received proceeds of the New Jersey Educational Facilities Authority (NJEFA) offer of $8,775,000 Revenue Bonds, 1980 Series A, the Institute for Advanced Study Issue. Of the net proceeds $4,100,000 was used to reimburse the Institute for the construction of its West Building, Dining Hall, and Social Science Library, and $1,976,559 was used to reimburse certain capital improvements. The balance is being used for major repairs and remodeling to the apartment housing facility for visiting members and other construction and major remodeling projects of Institute facilities.

The bonds are dated July 1, 1980, bear interest at the net average annual rate of 7.804%, are subject to redemption at various prices, and mature on July 1 of the years 1981 through 1995 with the final balance of $6,630,000 maturing on July 1, 2011. Bond principal in the amount of $95,000 matured on July 1, 1981 and bond principal in the amount of $100,000 (1982), $105,000 (1983), $110,000 (1984) and $115,000 (1985) will mature on July 1 of the designated years. The obligation to pay the Authority on a periodic basis, in amounts sufficient to cover principal and interest due on the bonds, is a general obligation of the Institute. The bonds are collateralized by United States Treasury Notes, 13.00% due November 15, 1990, with an aggregate face amount of $8,700,000.

The Institute for Advanced Study Apartment Bonds of 1956 are collateralized by (1) a first mortgage on the members' housing project with a cost of $2,193,299, (2) a first lien and pledge of gross revenues from the project and (3) United States Treasury Notes, 7.875% due November 15, 1982, with an aggregate face amount of $125,000.

The bonds, which mature serially on December 1 of each year, bear interest at the rate of 2¾% and are payable $31,000 in 1981, increasing each December 1 with final payment due December 1, 1996 and are subject to redemption at various prices.

The note is payable in monthly instalments of $1,538, with final payment due January 1, 1984.

The interest expense for the year ended June 30, 1981 was $661,000.

E.

Separate voluntary defined contribution retirement plans are in effect for faculty members and eligible staff personnel, both of which provide for annuities which are funded with the Teachers Insurance and Annuity Association and/or the College Retirement Equities Fund.

Payments for the year ended June 30, 1981 amounted to $260,000.

In addition to the formal plans, the Board of Trustees or the Director has at various times authorized the payment of pensions to certain members, employees and the widow of a deceased member. Total pension payments which aggregated $23,000 for the year ended June 30, 1981 have been charged to expense and no reserves have been provided for pensions payable in subsequent years.

F.

The Institute is the residuary beneficiary of a trust under the Will of George Placzek, Deceased, and upon the death of the life tenant will be entitled to receive the corpus thereof. The approximate market value of the assets under the Will, as reported by the accountant for the Estate, aggregated $965,000 as of June 30, 1981 and is not included in the accompanying financial statements.

G.

Restricted operating funds receipts, which are recorded initially as deferred restricted revenue, are reported as revenues when expended in accordance with the terms of the restriction. Changes in deferred restricted revenue amounts are as follows:

	Specific Purpose Funds	*Government Contracts*	*Total*
Balance at beginning of year	$ 190,781	$ - 0 -	$ 190,781
Additions:			
Contributions	1,282,359	204,798	1,487,157
Endowment income	1,380,885		1,380,885
Receivables	9,859	101,834	111,693
Total additions	2,673,103	306,632	2,979,735
Deductions:			
Funds expended during year	2,353,506	267,853	2,621,359
Transfer to endowment and similar funds	230,589		230,589
Transfers to unrestricted current funds	171,815		171,815
Total deductions	2,755,910	267,853	3,023,763
Balance at end of year	$ 107,974	$ 38,779	$ 146,753

H.

The costs of providing the various programs and other activities have been summarized on a functional basis in the statement of support and revenue, expenses, capital additions, and changes in fund balances. Accordingly, certain costs have been allocated among the programs and supporting services benefited. The costs incurred by the Institute in operating both the Dining Hall ($216,740 net of $157,380 in revenues) and Members' Housing ($587,740 net of $463,800 in revenues) have been allocated among the programs and supporting services benefited.

Donors

The Institute for Advanced Study gratefully acknowledges contributions of gifts, grants and pledges in the amount of $3,031,077.98 received between July 1, 1980, and June 30, 1981. Space limitations prohibit listing all of those who supported the Institute during this period. Following are the names of individuals and organizations who made contributions of $1,000 or more. To all of the contributors, the Institute expresses its deepest appreciation.

Individuals

Mr. and Mrs. Charles K. Agle
Anonymous donors
Association of Members of the Institute for Advanced Study
Gladys Bakhash and friends of the Institute
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National Aeronautics and Space Administration
National Endowment for the Humanities
National Science Foundation
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